Petition

81-1718

Office - Supreme Court, U.S.
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ALEXANDER L. STEVAS,
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No.

IN THE

Supreme Court of the United States

OCTOBER TERM, 1981

DEVEX CORPORATION, TECHNOGRAPH, INC., WILLIAM C. McCOY, JR., individually and as Executor of the Estate of WILLIAM C. McCOY, deceased, THEODORE A. TE GROTENHUIS, FREDERICK B. ZIESENHEIM, MARJORIE TE GROTENHUIS, and KATHARINE M. BASSETT,

Petitioners,

v.

GENERAL MOTORS CORPORATION,

Respondent.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE THIRD CIRCUIT

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Question Presented

Where the Courts below have found continuous infringement of plaintiffs' patent by defendant, affecting over 1.3 biliion non-bumper parts and resulting in savings to the defendant of over $60 million, is it not error to award plaintiffs no compensation whatsoever for such infringement in light of the statutory mandate of 35 U.S.C. § 284?

Parties Below

The plaintiffs in this case are:

Devex Corporation, an Ohio Corporation; Technograph, Inc., a North Carolina Corporation; William C. McCoy, Jr., individually and as Executor of the Estate of William C. McCoy, an Ohio resident; Theodore A. Te Grotenhuis, an Ohio resident; Frederick B. Ziesenheim, a Pennsylvania resident; Marjorie Te Grotenhuis, an Ohio resident, and Katharine M. Bassett, a Connecticut resident.

The defendant is General Motors Corporation, a Delaware Corporation.

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GENERAL MOTORS CORPORATION,

Respondent.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE THIRD CIRCUIT

Petitioners, Devex Corporation, et al., respectfully pray that a Writ of Certiorari issue to review the Judgment entered on December 15, 1981 by the United States Court of Appeals for the Third Circuit.

Opinions of the Courts Below

The Opinion of the Court of Appeals on the accounting is reported at ——— F.2d ——— (A304a).* Its orders denying plaintiffs' petition for rehearing and denying General Motors' petition for rehearing en banc appear at A343a-A344a. The Opinion of the District Court is re-

* Citations are to the Joint Appendix separately bound, herein designated by "A" and page number.

ported at 494 F. Supp. 1369 (A280a). The Special Master's recommendation, unreported, is set forth at A153a.

The Opinion of the Court of Appeals for the Seventh Circuit on the issue of validity is reported at 321 F.2d 234 (1963), *cert. denied,* 375 U.S. 971 (1964) (A61a). The opinion of the Court of Appeals for the Third Circuit on the issue of infringement is reported at 467 F.2d 257 (1972), *cert. denied,* 411 U.S. 973 (1973) (A138a).

Jurisdiction

The Judgment of the Court of Appeals was dated and entered on December 15, 1981. The respective Petitions for Rehearing of the plaintiffs and defendant were denied by the Court of Appeals on January 13, 1982. This petition for certiorari was filed within 90 days of that date. The jurisdiction of this Court is invoked under 28 U.S.C. § 1254(1).

Statute Involved

This case involves § 284 of the Patent Statute, 35 U.S.C.:

> Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court.
>
> When the damages are not found by a jury, the court shall assess them. In either event the court may increase the damages up to three times the amount found or assessed.
>
> The court may receive expert testimony as an aid to the determination of damages or of what royalty would be reasonable under the circumstances.

Statement of the Case

This is an action for patent infringement by the patent owners and exclusive licensee, plaintiffs, against General Motors, defendant. The patent is Reissue Patent No. 24,017, sometimes called the Henricks or Devex patent. The patent issued March 4, 1952 and expired March 4, 1969.

Claim 4, the only claim of the patent involved, has been held valid, 321 F.2d 234 (7th Cir., 1963) *cert. denied* 375 U.S. 971 (1964). It is also settled that claim 4 was infringed by this defendant in the production of bumpers and cold extruded, non-bumper parts, 467 F.2d 257 (3d Cir., 1972), *cert. denied,* 411 U.S. 973 (1973). The present petition arises out of the accounting that followed the validity and infringement rulings. Upon the accounting before a Special Master (Bruce M. Stargatt, Esquire), additional bumper and non-bumper practices were found to infringe, but plaintiffs were awarded a reasonable royalty rate of ½ of 1% on bumper infringement only. The District Court modified this, first by finding, contrary to the Master, that certain accused rinse practices infringed, and, second, by increasing the rate on the infringing sales value of bumpers to ¾ of 1%, for an award to plaintiffs in the amount of $8,813,945.50. Further, the District Court accepted the Master's recommendation that interest be paid from dates of infringement at prevailing corporate bond rates. Interest in the amount of $11,022,854.97 brought the total amount of the judgment to $19,836,800.47.

The District Court, however, also accepted the Master's conclusion that no royalty should be awarded on extensive findings of cold extruded, non-bumper infringement.

Both sides appealed to the United States Court of Appeals for the Third Circuit, which unanimously affirmed the judgment of the District Court (1981) (A304a).

Claim 4 of the patent provides as follows:

> The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal.

This lubricating process is used in cold forming metal car parts by pressure.

> The happy result of [the Devex] process is that phosphate, soap and borax work to lubricate the pressure-forming operation, preventing harmful contact between the metal products and the machinery with which they are formed. . . . [The Devex process] is especially beneficial because it may be easily cleaned from the metal product following its formation.

Devex Corp. v. *General Motors Corp.*, 494 F. Supp. 1369, 1372 (D. Del. 1980) (A282a).

This petition for a writ of certiorari involves only one of the many issues litigated below.

The Court of Appeals affirmed the District Court's finding that GM engaged in massive infringement of the patent in the manufacture of *non-bumper* parts. Notwithstanding this finding of infringement, the Courts below declined to award plaintiffs *any* compensation whatever. This startling result was defended on the grounds that Devex's proffered standard of comparison to assess damages was unacceptable and, even if Devex's standard were acceptable, GM's various divisions "easily substituted non-infringing processes." The lower Courts thus concluded that the Henricks process was of "relatively slight importance" to

GM, and no award of damages was necessary. The record simply does not support these conclusions. On the contrary, the stipulated and undisputed facts developed below establish both the importance of the process to GM and the reasonableness of plaintiffs' standard of comparison which was nothing other than GM's *actual* manufacturing method of machining and hot forging that was in use throughout the entire patent period.

1. Plaintiffs' Standard of Comparison for Cold Extrusion.

Plaintiffs chose as the standard of comparison GM's actual non-infringing manufacturing method in making non-bumper parts, namely, machining or hot forging. The uncontroverted evidence is that GM used this very comparison in the regular course of business to compute its savings at the time it converted to the use of the Henricks process. Thus, GM, in the regular course of business, prepared Appropriation Requests for approval by top management, which contained an analysis of savings to be realized* in a conversion from the prior manufacturing method. These "Appropriation Requests"—which were all included in the record below—demonstrate that GM itself compared the advantages of the cold extrusion process using the Henricks system with GM's prior, actual manufacturing method—machining or hot forging—in order to calculate GM's savings. Furthermore, GM's conduct in this regard was consistent with the industry-wide practice of calculating savings by comparing cold extrusion to traditional machining methods.**

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* Where available, actual savings realized were used.

** Indeed, this was the standard method of comparison as late as 1969. *E.g. Impact Machining* (Verson Allsteel Press Co. 1969). Several similar articles and pamphlets were also put into evidence below.

Moreover, the machining and hot forging methods used by GM in its regular, commercial production, were hardly "uneconomical," as the lower courts suggested. Indeed, GM itself made no such contention. The view of the courts below that such practices were "too old and inefficient" to constitute a standard of comparison is contrary to the stipulated and uncontested facts; it was the efficiencies of the Henricks process for large-scale cold extrusion production on certain parts in the millions that caused GM to replace its hot forging and machining operations with the Henricks process. Because the Henricks process was the replacement for hot forging and machining, these practices constitute the best standard of comparison for estimating cost savings from GM's adoption of the Henricks process.

2. The Henricks Process Was Superior, Indeed Dominant, for Cold Extrusion.

GM's lubrication manuals, the documentary evidence and testimony, and its actual practice, all show without contradiction in the record that the Henricks lubricating system for cold extrusion was superior and indeed at times, even dominant and preemptive, making the difference between success and failure.

The experience at the Saginaw plant where GM made steering gears is instructive. The amount of savings for Saginaw's infringement amounted to $29,012,550 or 47.7% of the total savings. Saginaw manufactured steering gears for GM, a critical part, for which high quality was vital. That need was one of the reasons for the use of the Henricks lubricating system at Saginaw. That division produced over 300 million parts that were found by the District Court to be infringing.

The District Court's finding of infringement at Saginaw covers 90.3% of Saginaw's total parts produced by cold extrusion for the period 1957 through the expiration of the patent, March 1969.

Based on the Master's finding of infringement at Saginaw, there were savings of $5 million on 64 million parts. And, because the District Court held rinsing with borax (or equivalent) to be an infringement, there were additional savings of $24 million on 248 million infringing parts. Thus, the entire scope of infringing use at Saginaw was dramatically altered by the District Court's decision.

The record shows that Saginaw infringement commenced in 1956, the year this lawsuit commenced. Between 1956 and 1963, infringement expanded by volume and in number of parts made with borax. After the patent was held valid in July of 1963, Saginaw continued to increase the volume on the parts that were then infringing and continued to expand the number of parts upon which it utilized borax. Borax was so essential at Saginaw that once the process was started for extruding particular parts, the division never deviated from that process throughout the life of the patent except as to one part out of twenty.

The testimony of Robert Hargesheimer, GM's most prominent expert on cold extrusion, demonstrates the importance of borax in the cold extrusion process at Saginaw. On cross-examination, he testified that he knew about the alternative lubricants, but Saginaw was quite satisfied with the results of the borax rinse. Indeed, Mr. Hargesheimer agreed with plaintiffs' contentions regarding the extent of infringement at Saginaw:

> "Q. So that it is fair to say, isn't it, that as depicted on PX-A-146-B-1, the extent of use by Saginaw of the accused practices expanded dramatically, even after the patent was held valid, isn't that correct?
>
> A. Yes."

The importance of the Henricks process to Saginaw cannot be ignored. As Mr. Hargesheimer himself stated:

> "The lubricant is very important. You can't flow metal without having a very good lubricant, especially an extrusion."

He also agreed that the lubricant makes the difference between success and failure:

> "if the lubricant fails, your part will fail . . ."

There were other divisions, too, where cold extrusion infringement took place: Chevrolet Cleveland Parma, Delco-Remy, Diesel Equipment, Delco Products, Delco Electronics, Chevrolet-Buffalo, Chevrolet Bay City, Oldsmobile and Pontiac.

3. GM Saved More Than 60.8 Million Dollars.

The District Court, rejecting the Master's contrary finding, found that rinse processes involving the use of borax or equivalent infringed. The Court of Appeals affirmed. That finding increased the number of infringing non-bumper parts from 680 million to 1.37 billion. The resulting savings to GM from the use of the Henricks process in cold extrusion over machining or hot forging is $60.8 million.* This amount of savings is undisputed based on the standard of comparison of GM's machining or hot forging.

4. The Parties Agree That A Reasonable Royalty Here Is A Fair Share Of GM's Savings.

Mr. Haight, defendant's expert, testified that a percentage of savings due to the change to an infringing practice is a fair method of fixing a reasonable royalty. He stated that the range is "up to 50 percent" and that 25% to 33⅓% may be "a little niggardly". Plaintiffs' experts thought 55% of savings was a reasonable royalty rate. Plaintiffs have asked for a reasonable royalty of $34,760,245, an average of 2½¢ per non-bumper part. The detailed breakdown by each division is in the record below.

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* Plaintiffs' expert prepared detailed analyses of the General Motors appropriation requests and made adjustments where necessary to include all items of cost: material, labor and burden. His method is undisputed.

REASONS FOR GRANTING THE WRIT

The Failure by the Courts Below to Award Any Royalty on 1.3 Billion Infringing Non-Bumper Parts, Notwithstanding GM's Savings of over $60 Million from Such Infringement, Ignores the Express Mandate of 35 U.S.C. § 284 As Interpreted By This Court, and Other Federal Courts.

The holding of the Court below violates the requirement of a reasonable royalty under 35 U.S.C. § 284 after a finding of infringement. Review by the Supreme Court of that holding is important to assure proper administration of the patent law in accordance with the intent of Congress. It is also necessary to vindicate the prior holdings of this Court and other Federal appeals courts.

The Court of Appeals for the Third Circuit has vitiated the holding of one of the leading cases in the patent field, *United States Frumentum Co.* v. *Lauhoff*, 216 F. 610, 616 (6th Cir. 1914), that:

> "It is a travesty to allow [patent] property rights to be seized and infringed without remedy . . ."

The Third Circuit rejected the standard of comparison actually in use by GM during the patent period. The calcualtion of savings by comparing costs between the infringing process and an appropriate standard of comparison (the reasonable royalty being a fraction of the savings) evolved as a method of determining damages on a process patent in *Tilghman* v. *Proctor*, 125 U.S. 136, 146 (1888), followed in a long line of cases. *E.g., Gordon Form Lathe Co.* v. *Ford Motor Co.*, 133 F.2d 487 (6th Cir. 1943); *Cambria Iron Co.* v. *Carnegie Steel Co.*, 224 F. 947, 948 (3d Cir. 1915). As this Court stated in *Tilghman*: an infringer's savings are the difference between "the fruits of the advantage which he derived from the use of th(e) invention, over what he would have had

in using other means then open to the public and adequate to enable him to obtain an equally beneficial result." 125 U.S. at 146.

In the leading case of *Gordon Form Lathe Co.* v. *Ford Motor Co.*, 133 F.2d 487, 494-95 (6th Cir. 1943), the Court of Appeals held that plaintiff had to pick only one appropriate standard of comparison, leaving to the defendant, who did not accept it, the burden of proving there was a better standard. The *Gordon Form Lathe* Court held further that a non-infringing practice in actual use by the infringer at the beginning of the infringement period is an "appropriate standard of comparison". *Id.* 498. Thus, where the plaintiffs' chosen standard is defendant's actual use, plaintiffs satisfy their "initiative" burden in showing defendant's cost affected by adoption of the infringing process. That is precisely what plaintiffs did in the present case. Defendant had used machining and hot forging in manufacturing non-bumper parts at the time it switched to the patented process. Plaintiffs' choice of machining and forging as their standard of comparison thus comes squarely within *Gordon Form Lathe* and the other authorities approving reliance on actual practice by the infringer as an appropriate standard of comparison.

The Court of Appeals affirmed the District Court's rejection of plaintiffs' standard of comparison on the ground that machining and hot forging were "uneconomical" or "inefficient" (A294a; A334a). If the standard of comparison was "uneconomical" or "inefficient" at the time of GM's conversion to the Henricks patent during the 1950s or 1960s, it was only made such by GM's use of the patent. The courts below thus overlooked the rule stated in *Tilghman* v. *Proctor*, 125 U.S. 136, 151 (1888):

> "But as to the comparative expense of the old process, the cost at which they used that process, if they did once use it, [is] strong evidence against them, be-

> cause they may be presumed to have used it as economically as they could . . ."

Here, GM is presumed to have used machining or hot forging "as economically as [it] could," and the cost thereof is "strong evidence" against GM.

Based on GM's actual methods of manufacturing non-bumper parts by machining or hot forging, the uncontested savings to GM by switching to the Henricks patented process were $60.8 million. Plaintiffs having satisfied their "initiative" burden, GM then had the burden, if it wanted to contest that proof, to prove a better standard from its point of view with demonstration of smaller savings from the infringing use. *Tilghman* v. *Proctor,* 125 U.S. 136 (1888); *Gordon Form Lathe Co.* v. *Ford Motor Co.,* 133 F.2d 487, 498 (6th Cir. 1943); *Phil. W. W'ks Co.* v. *U.S. Rubber Reclaim. W'ks* 227 F. 171, 177 (2d Cir. 1921); *Cambria Iron Co.* v. *Carnegie Steel Co.,* 224 F. 947 (3d Cir. 1915). But GM never even attempted to show that its savings on the infringing parts were less than $60.8 million, based either on plaintiffs' standard of comparison or any alternative standard.

Plainly, as the cause of saving GM over $60 million in infringing non-bumper manufactures, the Henricks patent was not of "relatively slight importance" (A295a). Even a small saving on each infringing part becomes important for an aggregate of 680 million, the stipulated number of non-bumper parts the Master found to have been made by the infringing processes; and, *a fortiori,* for the stipulated 1.37 billion non-bumper parts the District Court found to be infringing, after including GM's rinse practices. At defendant's Saginaw plant, alone, infringing practices accounted for $29 million in savings, almost half the total. In the period 1957-1969, 90% of Saginaw's stipulated non-bumper production infringed. This is "important" by any reasonable criterion in determining a reasonable royalty for patent infringement.

Indeed, it is hard to understand how the Courts below accepted the argument that the Devex patent "was relatively unimportant in non-bumper making" (A334a) in the face of the well-settled rule that massive infringement of this type "is an admission by conduct" that the patented process occupied *"a uniquely favorable position* in the market place", *Panduit Corp.* v. *Stahlin Bros. Fibre Works,* 575 F.2d 1152, 1160 (6th Cir. 1978) quoting from *Georgia Pacific Corp.* v. *U.S. Plywood-Champion Papers,* 318 F. Supp. 1116, 1123, *aff'd* 446 F.2d 295 (2d Cir. 1971), *cert. denied,* 404 U.S. 870.*

Defendant agreed that percentage of savings was the only reasonable basis for determining royalty on infringing manufactures of parts other than bumpers; and its own expert opined that 25% to 33⅓% was a "niggardly" percentage. The courts have generally allowed not less than 25%. *E.g. Tights Inc.* v. *Kayser Roth Corp.,* 442 F. Supp. 159 (M.D.N.C. 1977).

The courts below found infringement on over 1.3 billion cold extruded parts but refused to award any royalty whatsoever thereon. This, plaintiffs submit, shocks the conscience of the Court. This failure to grant any royalty on non-bumper infringement is contrary to the mandate of 35 U.S.C. § 284, requiring the court to "award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer . . .", and should be reviewed by this Court.

---

* Emphasis added by Chief Judge Markey of the Court of Customs and Patent Appeals, sitting by designation in the Sixth Circuit.

CONCLUSION

For the foregoing reasons, the Petition for Writ of Certiorari should be granted.

Respectfully submitted,

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Joint Appendix

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JOINT APPENDIX TO PETITIONS FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE THIRD CIRCUIT

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(Continued on inside front cover)

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UNITED STATES CODE
TITLE 35 — PATENTS

* * *

§ 112. Specification

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention. A claim may be written in independent or dependent form, and if in dependent form, it shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim.

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof. (Amended July 24, 1965, Public Law 89-83, sec. 9, 79 Stat. 261.)

* * *

§ 284. Damages

Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court.

When the damages are not found by a jury, the court shall assess them. In either event the court may increase the damages up to three times the amount found or assessed.

The court may receive expert testimony as an aid to the determination of damages or of what royalty would be reasonable under the circumstances.

Patent Statutes as Repealed and Codified by Act of July 19, 1952 (66 Stat. 792)

Before any inventor or discoverer shall receive a patent for his invention or discovery, he shall make application therefor, in writing to the Commissioner of Patents, and shall file in the Patent-Office a written description of the same, and of the manner and process of making, constructing, compounding, and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound and use the same; and in case of a machine, he shall explain the principle thereof, and the best mode in which he has contemplated applying that principle, so as to distinguish it from other inventions; and he shall particularly point out and distinctly claim, the part, improvement, or combination which he claims as his invention or discovery. (Section 4888, R.S.)

The several courts vested with jurisdiction of cases arising under the patent laws shall have power to grant injunctions according to the course and principles of courts of equity, to prevent the violation of any right secured by patent, on such terms as the court may deem reasonable; and upon a judgment being rendered in any case for an infringement the complainant shall be entitled to recover general damages which shall be due compensation for making, using, or selling the invention, not less than a reasonable royalty therefor,

together with such costs, and interest, as may be fixed by the court. The court may in its discretion award reasonable attorney's fees to the prevailing party upon the entry of judgment on any patent case. (Section 4921, R.S., as amended by Act of Aug. 1, 1946, 60 Stat. 778.)

CONSOLIDATED CASES

Devex Corp. *v.* Houdaille Industries, No. 57 C 892
Devex Corp. *v.* General Motors Corp., No. 56 C 1912
(Judge Edwin A. Robson, N.D. Illinois, February 1, 1962)

DECISION ON MERITS ON VALIDITY OF CLAIM 4 OF REISSUE NO. 24,017.

An order of November 19, 1949, in these two causes, consolidated for trial, the common issue of validity[1] of Claim 4 of Reissue Patent No. 24,017 to John A. Henricks, reissued June 7, 1955, on original Patent No. 2,588,234, dated March 4, 1952, on application filed October 31, 1950.[2]

Suit No. 56 C 1912 was filed November 13, 1956, and [369] No. 57 C 892 on May 17, 1957. The patent concerns a "Method of Coating and Drawing Metal and Composition Therefor." Claim 4 thereof is as follows:

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[1] But not otherwise.

[2] On April 29, 1946, Henricks had filed patent application No. 665,905, which was abandoned.

> "The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal."

The patent was assigned to plaintiffs in 1955.

It is the Court's conclusion that Claim 4 of the reissue patent is invalid as anticipated by prior patents, prior use, and prior publications. The United States patents to Singer, Orozco and Whitbeck, the British patents, the 1943 runs at Briggs Manufacturing Company, and the German publications considered together reveal the phosphate coatings on metals to be drawn, in conjunction with lubricants, some co-acting with the phosphate coating. While it is arguable that the precise combination and co-action indicated by the patent are not found verbatim in the prior art, one armed with the knowledge of a worker skilled in that field could, the Court believes, have achieved the result covered by Claim 4 of the reissue patent. Furthermore, the breadth and indefiniteness of proportions of the elements of that claim[3] preclude a holding of its validity in view of the knowledgeable prior art,[4] in [370] view of the disclosures of the specifications, and un-

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[3] The specifications state that borax is to be used in the portions of *two to five times the amount of soap.*

[4] There is no specification, disclosure or limitation in Claim 4 of the amount or proportions of solid inorganic compound (borax) or solid meltable organic binding material (soap).

warranted monopolizing of the field of use of borax and soap.[5]

Plaintiffs state the invention is concerned with the lubrication of metal surfaces under the extreme conditions encountered in the drawing and deforming of metals which are difficult to work, such as steel. They rely, as is to be expected, upon the statutory presumption of validity (35 U. S. C. §282), especially as buttressed by the issuance of the patent over similarly cited prior art[6] and because the facts supportive of validity are gleaned from defendants' witnesses.[7] Defendants, however, assert this presumption is of no avail because "the true state of the prior art was not considered by the Patent Office."[8] It is explained that in the drawing of metal to transform a flat blank into another desired shape, there is necessarily some relative movement between the surface of the workpiece and the surface of the die, and a generation of high pressures and temperatures. Unless suitable provision for lubricating the surfaces is made, tearing of the metal or galling of the dies results, and the problem, plaintiffs state, is most acute where difficult draws of ferrous metal are in-

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[5] *O'Reilly, et al. v. Morse, et al.*, 56 U.S. 65 (1853); *Holland Furniture Company v. Perkins Glue Company*, 277 U.S. 245 (1928); *The Incandescent Lamp Patent*, 159 U.S. 465 (1895); *General Electric Co. v. Wabash Appliance Corp., et al.*, 304 U.S. 364 (1938); *United Carbon v. Binney & Smith Co.*, 317 U.S. 228 (1942).

[6] *Anderson Company v. Sears Roebuck and Co., et al.*, 265 F. 2d 755 (7th Cir., 1957); *The University of Illinois Foundation v. Block Drug Co., et al.*, 241 F. 2d 6 (7th Cir. 1957).

[7] *Eibel Process Company v. Minnesota & Ontario Paper Company*, 261 U.S. 45, 53 (1923).

[8] *Moran, et al., v. Protective Equipment, Inc., et al.* 84 F. 2d 927 (7th Cir. 1936); *Hobbs v. Wisconsin Power & Light Co., et al.*, 250 F. 2d 100 (7th Cir. 1957).

volved. The prior art revealed the use of various lubricating schemes including ordinary lubricating oils [371] or lubricants containing infusible pigments, such as clay, lime, mica or graphite — "wet film" lubricants, not fixed on the surface of the workpiece during the drawing operation. The function of the infusible pigments was to separate the die and the workpiece at the points of extreme deformation to prevent the squeezing-out of the lubricants, and simultaneously to act as a sponge for the lubricants. Although the functioning of the pigmented compositions was better than the others, the result was not too desirable in that minute particles of the pigments became embedded in the work drawn leaving it with a dull finish. Patentee, plaintiffs claim, requires a fixed soap-and-borax film, not just any ordinary wet film or grease lubricant.

It is defendants'[9] contention that Claim 4 is invalid because (1) of lack of patentable invention in view of the prior art known and practiced on April 29, 1946, the date of the abandoned application; (2) the process was known and used by others before the date of invention; (3) the patentee did not invent the process but simply adopted a process which was obvious to persons skilled in the art; (4) it is an aggregation of old steps which when com- [372] bined produces no new result;[10] (5) it is beyond the disclosure of the specifications; (6) it fails

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[9] Defendant Houdaille adopted defendant General Motors Corporation's reply brief and filed no "separate brief."

[10] Phosphate coatings were known to be improvement and aid in drawing and deforming operations and would increase life of drawing tools and reduce number of drawing operations (British patents Nos. 494, 830 (1938), 496, 866 (1938), 1941 publication Korrosion and Metallwirtschaft, 1938 U.S. Singer patent No. 2,105,015), and that they would provide a barrier to prevent scoring of metal being drawn or galling of dies. Defendants cite *Great Atlantic & Pacific Tea Co. v. Supermarket*

continued on next page

to specify amounts and proportions of ingredients;[11] (7) it covers prior art materials of soap and borax not disclosed in the specifications, which materials are used contrary to the purposes patentee contemplated.

[373] Defendants contend that a patentee may not compel independent experimentation by others to ascertain the bounds of the claims[12] and a patentee may not be claiming a method broadly in terms of a result or function, foreclose all means and ways of practically obtaining such result or objective.[13] Substitution of one material for another of the same class in an old combination does not constitute invention.[14]

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continued from previous page

Equipment Corp., 340 U.S. 147 (1950); *Hollister, Collector v. Benedict & Burnham Manufacturing Company*, 113 U.S. 59 (1885); *Atlantic Works v. Brady*, 107 U.S. 192 (1882); *Smith v. Nichols*, 88 U.S. 112 (1874), *Hotchkill, et al. v. Greenwood, et al.*, 11 Howard 248; *Armour & Co. v. Wilson & Co., Inc.*, 274 F. 2d 143 (7th Cir. 1960); *Armour Research Foundation, etc. et al. v. C.K. Williams & Co., Inc.*, 280 F. 2d 499 (7th Cir. 1960); *Dow Chemical Co. v. Halliburton Oil Well Cementing Co.*, 324 U.S. 320 (1945); *Jungersen v. Ostby & Barton Co., et al.*, 335 U.S. 560 (1949); *Emery Industries, Inc. v. Schumann, et al.*, 111 F. 2d 209 (7th Cir. 1940); *Himmel Bros. Co. v. Serrick Corporation*, 122 F. 2d 740 (7th Cir. 1941).

[11] 35 U.S.C. § 112; *Johns-Manville Corporation v. Johnson & Co. v. Hillman's*, 135 F. 2d 955 (7th Cir. 1943); *Fruit Treating Corporation, et al. v. Food Machinery Corporation*, 112 F. 2d 119 (5th Cir. 1940); *The Incandescent Lamp Patent*, 159 U.S. 465 (1895); *General Electric Co. v. Wabash Appliance Corp., et al.*, 304 U.S. 364 (1938); *United Carbon Co., et al. v. Binney & Smith Co.*, 317 U.S. 228 (1942); *Graver Tank & Mfg. Co. Inc., et al. v. Linde Air Products Co.*, 336 U.S. 271 (1949).

[12] *Standard Oil Company of California v. Tide Water Associated Oil Co.*, 154 F. 2d 579 (3rd Cir. 1946).

[13] *National Carbon Co., Inc. v. Western Shade Cloth Co.*, 93 F. 2d 94 (7th Cir. 1937).

[14] *Johnson Laboratories, Inc. v. Meissner*, 98 F. 2d 937 (7th Cir. 1938).

That broadness of a claim such as Claim 4, defendants assert, has long been condemned.[15]

On the other hand, patentable invention is claimed by plaintiffs in that it is asserted that Henricks' patented process, although using old elements, achieves new and surprising results, or, stated differently, the whole exceeds the sum of the parts.[16]

[374] They frankly concede that all the elements of the Henricks' invention were old, but urge they were put together in a new way, resulting in new and unpredictable results and reactions. They emphasize that Claim 4 uses a phosphate coating (the abrasive coating of the Singer process), seemingly a retrogression in the art; a *fixed* overlying film of which the solid meltable inorganic consistent is soap and a meltable inorganic compound (Borax) distributed therethrough, meltable at a temperature below the melting point of the abrasive phosphate coating and having a hardness not more than 5 on the Mohs' scale.

The "amazingly efficient" and "remarkable" results claimed by plaintiffs from the Henricks' patented process is that "the surface of the product is improved, product dimen-

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[15] *O'Reilly, et al. v. Morse, et al.*, 56 U.S. 61 (1853); *Holland Furniture Company v. Perkins Glue Company*, 277 U.S. 245 (1928); *The Incandescent Lamp Patent*, 159 U.S. 465 (1895); *General Electric Co. v. Wabash Appliance Corp., et al.*, 304 U.S. 364 (1938); *United Carbon Co. v. Binney & Smith Co.*, 317 U.S. 228 (1924).

[16] *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147 (1950); *Lewyt Corporation v. Health-Mor, Inc., et al.*, 181 F. 2d 855 (7th Cir. 1950); *Blaw-Knox Company v. I.D. Lain Company, Inc.*, 230 F. 2d 373 (7th Cir. 1956); *The Mojonnier Dawson Company v. U.S. Dairies Sales Corporation*, 251 F. 2d 345 (7th Cir. 1958); *Armour & Co. v. Wilson & Co., Inc.*, 274 2d 143 (7th Cir. 1960); *Donner v. Sheer Pharmacal Corporation*, 64 F. 2d 217 (8th Cir. 1933).

sions are maintained with consistency, tool life is lengthened, and the practical limits of the shaping operation are extended." Further, the "formation of insoluble or difficultly-soluble deposits on the drawn metal is inhibited, such as zinc stearate. Instead of the phosphate coating reacting with the soap to form insoluble abrasive compounds, the phosphate reacts with the borax to form amorphous, glassy materials which contribute significantly to the lubricating value of the coating and assist in the drawing operation and yet, amazingly do not present any problem of cleaning." The process results in articles of "superior quality at lower cost." Defendants, on the other hand, deny any unexpected or surprising co-action or results by the use of soap-borax lubricants over phosphate. They note that there is no substantial difference in the rods introduced in evidence, drawn only with phosphate coating and with soap, and with soap and borax.

[375] Plaintiffs adduced expert testimony of X-ray diffraction analyses asserted to prove the glassiness of the worked surface. Defendants belittle the X-ray diffraction tests, as not identifying with any certainty the quantitative values or amounts of the compounds alleged to have been formed by the chemical reaction of the borax, or that they were present in any substantial quantity or had any controlling or significant effect in the drawing operations to which the sample rods were subjected.

Plaintiffs contend that the prior art other than that cited before the Patent Office is without weight as not disclosing anything not covered by the prior art that was before the Patent Office, and therefore is not significant as not disclosing anything substantial not considered by the Patent Office.[17] They readily acknowledge prior art use of soap and borax dry

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[17] *Otto v. Koppers Company, Inc.*, 246 F. 2d 789, 801 (4th Cir. 1957).

film lubrication over bare metal, patentee having so stated in the specifications of the patent in suit. They confidently point to the fact that defendants relied on thirty-one references at the trial, which plaintiffs deign a per se indication that there is no single anticipating reference, and the fact that so many references were cited means that none of them anticipates.[18] Plaintiffs further maintain that defendants have the burden of proving invalidity on the ground of prior public use, which must be established beyond a reasonable doubt,[19] and oral [376] testimony unsupported by contemporaneous documentary or physical evidence is not enough.[20] They dispatch with alacrity the alleged prior public uses as having been very brief episodes during World War II, and none of the presently accused processes stems from those uses, and "Whatever was done in those plants was history — long since dead and buried and resurrected only for the defense of this case."

Defendants point out that the Patent Office did not have before it at the time of the issuance of the Henricks' patent, the Singer patent, the Orozco patent No. 1,982,065, or the British patent No. 494,830, or several material publications.[21] The Patent Office was not advised that lubricated phosphate

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[18] *Ric-Wil Co. v. E.B. Kaiser Co.*, 179 F. 2d 401, 404 (7th Cir. 1950), cert. den. 329 U.S. 958.

[19] *Coffin v. Ogden*, 85 U.S. 120 (1874); *Eibel Process Company v. Minnesota & Ontario Paper Company*, 261 U.S. 45 (1923); *Smith v. Hall*, 301 U.S. 216 (1937).

[20] *Miner v. T.H. Symington Company*, 250 U.S. 383 (1919); *Smith v. Hall*, 301 U.S. 216 (1937); *Cline Electric Mfg. Co. v. Kohler*, 27 F. 2d 638; *Cold Metal Products Company v. E.W. Bliss Company*, 285 F. 2d 244 (1960).

[21] Transactions of American Society for Steel Treating, 1933; Wire & Wire Products, October, 1931; Korrosion & Metallschutz, 1941; Metallwirtschaft, 1942; Stahl and Eisen, 1942.

coatings were in common public use in 1943 in drawing metal; or that Gilron Products Company's Drawcote soap-borax lubricants disclosed in the Orozco No. 2,469,473 and Henricks No. 2,530,837 patents, and Whitbeck patent No. 2,470,062 were in common public use in 1943. The Orozco patent attributes the lengthening of die life[22] to the use of soap-borax lubricants which were in public use in 1943.

The Singer patent No. 2,105,015,[23] issued January 11, 1938, on application of May 14, 1936, pertained to "Mechanically Working Metal Article," having for its [377] object the reduction or elimination of difficulties theretofore encountered through contact of the metal article and the working tool, particularly in the field of ferrous metals, specifically, steel, where drawing dies were found to tend to bite into or seize the metal, thereby interfering with the proper drawing or reducing operation. It is noted by plaintiffs that theretofore lubricants, principally oil, had been utilized, but were found insufficient at high speed or high deformation rates. They further cite the advantages and disadvantages of the art of liming or soft metal coatings which had been used. The patent disclosed that the difficulties could be materially reduced or overcome by providing the surface, of the article worked on, with a "thin crystalline coherent coating of a metallic oxide or salt, with crystals of which are in heterogeneous crystalline joint with the metal base and are tightly grown together with the latter. ***" It disclosed that while the coating could be considered a lubricant, it was not a lubricant in the ordinary sense for the reason that the present methods of lubrication "*may also be used in conjunction* with

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[22] Stated in the patent to be thirty per cent.

[23] Not before the Patent Office as prior art, but defendants state that British Patent No. 496,866 was cited and it discloses a process similar to the Singer process.

the practice of the present process, and in many instances will be an essential factor in obtaining proper results." (Emphasis ours).

This Singer patent recommends the use for treating "coatings of iron or complex iron phosphates or oxalates." "There is formed on the article a dense thin crystalline coherent and tightly adherent coating of salts of phosphoric or oxalic acid which combines both chemically and physically with the metal of the base." Singer further states that "such a coating adapts the article admirable to [378] mechanically working and reduces or eliminates the troubles arising from the contact of the article with the working element." He also specifies that "In many instances no further removal of the coating is necessary after working, either because it has been substantially removed during the working operation or that portion which remains does not interfere with the use to which the article is subsequently applied."

Defendants point out that the 1938 Singer patent is specifically directed to the process of drawing steel, to the use of phosphate coatings, to prevent metal-to-tool contact in the drawing process, and recommends that the phosphate coatings be lubricated with known methods of lubrication, which process permits severe reduction rates. They further maintain all patentee did was follow Singer's teachings exactly, using well-known prior art methods of lubrication, Gilron soap-borax, to Singer's phosphate coating.

Plaintiffs differentiate Singer's contribution as forming a sponge-like coating on the surface of the workpiece, the coating being adherent to it and not displaceable and necessarily moving with the surface of the workpiece into the high pressure zone, and being sponge-like would carry lubricant with it. The sponge of Singer was a metallic phosphate of zinc or iron. Plaintiffs state the phosphate coatings were old and had no lubricating value per se, but on the contrary were

abrasive. The limitations of the Singer process were that it left an oily film upon the surface of the workpiece which film was difficult and expensive to remove, especially where electroplating was contemplated, which required a clean surface. Plaintiffs [379] contend that Singer nowhere teaches or suggests the use over phosphate of a *fixed* film comprising an organic binding material with meltable inorganic compounds distributed through it, such as soap and borax, and so clearly does not anticipate Claim 4.

It is defendants' contention that patentee knew in 1943[24] that Gilron Drawcote soap-borax lubricants could be used over phosphate coatings in accordance with Singer's teachings but it was to Whitbeck's interest to promote the sale of Drawcote at the better price he could obtain if used without the phosphate coating. If any superiority arises in the use of the Gilron Products it is due to the patented features of the Orozco patents 2,469,473 and 2,530,837, and Whitbeck patent 2,470,062, and the instant patent is but an effort to repatent the Singer process and the patented Gilron soap-borax lubricants.

Another of the cited prior art is U.S. Patent No. 2,469,473 to Orozco and Henricks, dated May 10, 1949,[25] on a "Method of Lubricating Metal Surfaces During Cold Working." The patented invention utilizes a planned succession of endothermic reactions initiated by the frictional heat that not only cools the frictional surfaces by absorbing heat but which produces nascent fluid lubricants at points of extreme heat and pressure. "The preferred procedure uses both fusible organic and fusible inorganic mate- [380] rials to produce such succession of reactions." This patent further stated that it

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[24] Henricks assisted Whitbeck, his employer, at the Briggs Company.

[25] Applied for in 1943.

> "utilized inorganic compounds to achieve the essential cooling and lubrication of the 'sliding' surfaces at the elevated temperatures existing when combustible organic lubricants are ordinarily no longer capable of functioning; but, in addition, we utilize properties of the inorganic materials to increase the thermal stability of the preferred organic lubricants used."

Defendants cite this patent as disclosing increased die life from the use of prior art Gilron Products' soap-borax lubricants. They cite Orozco Patent No. 1,982,065 of November 27, 1934, as showing that it was known that soap and borax were a good lubricant for use in deforming steel by cold rolling to prevent sticking of the work and prevent scarfing of the work.

The 1938 British Patent No. 494,830 was not considered by the Patent Office. Defendants claim that this patent discloses in all essential respects the process broadly claimed by Claim 4 of the patent in suit. This British patent taught the treating of iron pipes, prior to drawing, with fats or oils, or to precipitate deposits thereon in order to soften the surface and to reduce the wear on the drawing tools. It stated that it also has been "the practice to mix the oil or fat with pulverulent substances, such as talc or litharge, for the purpose of increasing its efficiency." Defendants point out that fats are known to include tallows which are solid at room temperature; that tallows are one of the oldest and most extensively used ingredients in drawing compounds, and it was known to mix drawing compounds with fillers including borax. They also state that borax, aluminum stearate and litharge are within the classification of the "solid inorganic com- [381] pound" in Claim 4, that each has a melting point below that of ferrous phosphate; and each has a hardness not exceeding 5 on the Mohs' hardness scale. All are recommended in the patent in

suit as solid inorganic compounds to be included in the "solid meltable organic binding materials," which is claimed and alleged in the patent in suit to include sodium stearate or sodium tallow soap.

The British patent further states that

> "in place of using lubricants, to provide the surface of the iron, *** by means of a phosphate treatment, with a crystalline skin of oxides or salts, the crystals of which coalesced firmly with the foundations, such crystals being intended to lessen the wear on the drawing dies."

It further states:

> "[T]he layers applied by specific surface-treatment processes exhibit a porous, absorbent structure, and that the combination of such a surface treatment with a lubricating oil or fat, furnishes favorable results. *** [S]uch chemical processes as are capable of depositing a crystalline layer possessing active capillary properties on the surface of the workpiece and coalescing firmly with the foundation, said crystalline layer being also adapted, by reason of its absorbent capacity, to retain oils and fats. The phosphatising processes, and also the known treatment with oxalates and tannates, are specifically suitable for iron and steel."

The three prior public uses relied upon are (1) at the Briggs Body Company plant at Detroit; (2) the Buick Motor Company plant at Flint, and (3) the Northern Engraving Company plant at LaCrosse. Plaintiffs claim that the processes used were phosphate coating applied to shell casing blanks on which were applied wet film lubricants, in accordance with the Singer process. The wet film lubricant was abandoned, plaintiffs state, and the dry film soap and borax system

substituted for it to eliminate the phosphate. The phosphate coating compounds were sup- [382] plied by Parker Rust Proof Company. Plaintiffs cite the fact that no field reports were produced for two of the three purported public uses which they interpret as indicative that if produced they would have refuted and not aided the defense.[26] These uses, if existent at all, plaintiffs claim, were so fleeting as to be of no legal significance, "accidental results, not intended and not appreciated" and not constituting anticipation.[27]

Defendants, however, refute the weight to be accorded to the lack of field reports on the ground Parker Rust Proof Company in 1943 was not concerned with particular lubricants used over phosphates, and was not so interested until 1949 when it entered upon the development of Bonderlube 235.

Plaintiffs' version of the Briggs Body Company's prior use is that it was done at the beginning of experimental testing in changing over from the Singer process to Gilron, and amounted to less than two hundred blanks which had a soap and borax coating over the phosphate, the blanks having been subjected to six consecutive forming operations. These blanks were lost track of in the big flow of material. The incident is said to have no technical or commercial significance, and is not an invalidating prior use.[28] Plaintiffs further point out that at the Briggs' [383] plant the phosphate tank was

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[26] *H. Mueller Mfg. Co. v. Glauber*, 184 Fed. 609 (7th Cir. 1910); *Mammoth Oil Co. v. United States*, 275 U.S. 13 (1927).

[27] *Eibel Process Company v. Minnesota & Ontario Paper Company*, 261 U.S. 45, 66 (1923).

[28] *Miner v. T.H. Symington Company*, 250 U.S. 383 (1919); *Eibel Process Company v. Minnesota & Ontario Paper Company*, 261 U.S. 45, 53 (1923).

emptied and refilled with Gilron material so that the tank was no longer available for phosphating, and there never could have been a simultaneous use of Gilron over phosphate.

Defendants, on the contrary, claim that these operations at Briggs were not limited to a few baskets of shells but that there continued to be drawn through the summer, shells with phosphate coatings applied, and with the Gilron Drawcote. They stressed the fact that full knowledge of successful runs at the Briggs plant was had by patentee, Whitbeck (superior of patentee at Briggs Company), Tousley, and Gilron Company, and that proof of the knowledge was sufficient under the law[29] and the use was neither embryonic nor incomplete. Defendants also maintain the proof of prior use may be by parol testimony.[30]

In scotching as anticipatory the purported prior use at the Buick plant, plaintiffs point out that a wet film lubricant with scratchy, infusible pigments was employed as opposed to the fixed film with meltable inorganic compounds of Claim 4. There was said to be no fixed film organic binder and no solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate, or that the drawing compound used at Buick formed a fixed film over the phosphate or was anything other than a conventional wet film lubricant. There is no certainty of proof that sulphur was used, but even if it were used it is an element and not an inorganic compound within Claim 4.

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[29] *Coffin v. Ogden*, 85 U.S. 120 (1873).

[30] *Coffin v. Ogden, supra; Becker v. Electric Service Supplies Co.*, 98 F. 2d 366 (7th Cir. 1938); *Hobbs Patent Co. v. Atlas Specialty Mfg. Co.*, 244 Fed. 176 (7th Cir. 1917); *Kaser Process Pie Co., et al. v. Pie Bakeries of America, Inc.*, 50 F. 2d 414 (D.C. Ill. 1931).

[384] Defendants claim, however, the Buick plant was in large production of steel shell cases using lubricated phosphate coatings.

Plaintiffs also eschew the activities at Northern Engraving as a prior use on the basis that there was no fixed film used there and no meltable inorganic compounds in it. The Ferrolube used was not dry but plastic; in the drawing operation it was wiped off. Further, plaintiffs claim that inasmuch as the cost of the constituents of Ferrolube — stearic acid, sodium stearate, and sulphur — substantially exceed the price of Ferrolube, the story concerning Ferrolube is wholly incredible.

Defendants contend, on the other hand, this Company was in large production of lubricated phosphate castings, and that while Ferrolube[31] was not a fixed film and had no meltable inorganic compound in it, it did provide a film which stayed fixed with the phosphate coating through the drawing operation where both were substantially removed; it was a successful drawing lubricant and operation. Defendants note Claim 4 only requires that the film remain fixed with the phosphate coating in the drawing operation.

Defendants cite the publication, Wire & Wire Products, of October, 1931, as showing that tallow soap combined with aluminum stearate was a good drawing lubricant. They cite the June, 1941, publication of Korrosion & Mettalschutz as disclosing the use of zinc phosphate coatings in cold forming, lubricated with boring oil emulsion, as lengthening the life of drawing tools, reducing friction in the [385] forming process, increasing the reduction and drawing speeds, and reducing

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[31] There was a dispute raised by plaintiffs over the contents of Ferrolube asserting that according to the cost of the constituents it was being sold for less than cost price but defendants point out that much of the contents was water, thus reducing the product cost per pound.

the number of drawing operations; the 1942 publications of Mettalwirtschaft and Stahl und Eisen as also teaching zinc phosphate coatings, lubricated with soap thereby providing water insoluble soap films on the coatings. Defendants point out that nothing was said in the patent in suit about increasing the die life or the life of the drawing tools with the soap-borax lubricants applied over phosphate coatings.

The plantiffs state of the prior art development of the "Gilron" dry run film lubricant (called Drawcote) that it was a reversion to the early idea of using a finely divided solid material as a lubricant which was applied wet and permitted to dry out to a dry fixed film. One of the formulas consisted of soap and borax. The dry soap film formed on the workpiece served as a carrier for the borax somewhat analogous to the phosphate coating in the Singer process, except that the soap film had inherent lubricating value, and did away with the abrasive phosphate coating of the Singer process. When a soap film was used instead of the lubricating oil contemplated by Singer, the problem of residual deposit on the surface of the workpiece remained. The soap film when first applied was water soluble but after drawing was insoluble, because the soap was one made of animal fat, which chemically is sodium stearate, and when placed over a zinc phosphate coating and the work drawn, a chemical reaction results in the formation of zinc stearate, which is also a soap but a water-insoluble one, difficult to remove even with alkaline cleansing agents.

[386] Defendants cite as well known in 1943, more than two years prior to April 29, 1946, the date of the original application, the processes of drawing lubricants including tallow and tallow soaps with fillers or pigments including borax, aluminum stearate and litharge, compounds meltable below the melting point of ferrous phosphate and having a hardness not exceeding 5 on the Mohs' hardness scale; iron, zinc and manganese phosphate coatings lubricated with known

lubricants, or with soap, providing water insoluble soap films; Gilron Drawcote soap-borax fixed film drawing lubricants were known and in wide public use, and it was known it could be used successfully on zinc phosphate coated steel.

Plaintiffs, however, understandably argue that the fact that defendants follow the teachings of the patent in suit rather than the prior art is indicative of the presence of invention.[32]

It is plaintiffs' position that Henricks' invention was not obvious, as is manifested by the number of citations of anticipating patents and uses;[33] the unobviousness of Henricks' invention is shown by the history of Parker Rust Proof Company, a leader in the field. In 1949, it had decided to manufacture lubricating compounds for use over phosphate. It made a search of the literature which should have furnished them knowledge of the wet film lubricants for use with the Singer process and the dry film soap and borax lubricants, exemplified by Whitbeck [387] U.S. Patent No. 2,470,062. Plaintiffs point out that "Parker Rust Proof had spent thousands of dollars and years of effort to arrive at the results which Henricks had intuitively reached years beforehand. The personnel at Parker Rust Proof had far more than ordinary skill in the art and yet the invention of the Henricks' patent was not obvious." Plaintiffs also note that Parker Rust Proof is holding General Motors Corporation harmless as to all phosphate coating materials and lubricating compositions purchased from it.

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[32] *Goodyear Tire & Rubber Co., Inc., el al.* v. *Ray-O-Vac Company*, 321 U.S. 275 (1944), affg. 136 F.2d 159 (7th Cir. 1943); similarly *William A. Murray Spring Co.* v. *Fort Pitt Bedding Co.*, 23 F.2d 559 (3rd Cir. 1928); *Kurtz, et. al.* v. *Beel Hat Lining Co., Inc.*, 280 Fed. 277 (2nd Cir. 1922).

[33] *Ric-Wil Co.* v. *E.B. Kaiser Co.*, 179 F.2d 401 (7th Cir. 1950); *Hoeltke* v. *C. M. Kemp Mfg. Co.*, 80 F.2d 912 (4th Cir. 1935).

Defendants on the other hand, say patentee adopted an obvious, analogous and previously known use for soap borax[34] and that Parker Rust Proof Company must have had knowledge of the soap borax dry film system. After much experimentation, they had the idea of using a soap and borax dry film lubricant over phosphate, the "Bonderlube series." Defendants point out that the patent says nothing about increasing the die life with soap-borax lubricants applied over phosphate coatings. Furthermore, inventors are conclusively presumed to know the prior art,[35] and that it took no invention to achieve the patented process but only ordinary skill, with all the prior art and knowledge before him, to apply the Gilron soap-borax lubricants to phosphate coated steel. Defendants further maintain the presumption of validity of an issued patent falls where the true state of the prior art was not [388] considered by the Patent Office.[36]

Defendants dispute the history of "Bonderlube" as being evidence of the unobviousness of the alleged patented invention, and on the contrary assert it demonstrates the invalidity of Claim 4. They cite the pamphlets "Bonderite as an Aid in Cold Forming" and "Bonderite and Bonderlube as Aids in Cold Forming," of Parker Rust Proof Company, stating the Bonderite coating (a phosphate coating) integral with the

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[34] Similarly to the patentee's position in *Armour & Co. v. Wilson & Co., Inc.*, 274 F. 2d 143 (7th Cir. 1960).

[35] *Zephyr American Corporation v. Bates Mfg. Co., et al.*, 128 F. 2d 380 (3rd Cir. 1942); *Adams, et al. v. Galion Iron Works & Mfg. Co.*, 42 F. 2d 395 (6th Cir. 1930); *Allied Wheel Products, Inc. v. Rude*, 206 F. 2d 752 (6th Cir. 1953); *Application of Thayer*, 143 F. 2d 996 (C.C.P.A. 1944); *Applications of Adams and Free*, 284 F. 2d 525 (C.C.P.A. 1960); *General Time Corp. v. Hansen Mfg. Co.*, 199 F. 2d 259 (7th Cir. 1952).

[36] *Moran, et al. v. Protective Equipment, Inc., et al.*, 84 F. 2d 927 (7th Cir. 1936); *Hobbs v. Wisconsin Power & Light Company*, 250 F. 2d 100 (7th Cir. 1957).

metal surface reacts with the lubricating solution (Bonderlube) to form a water-insoluble soap which in itself becomes an integral part of the Bonderite coating. The 1942 publication, Metallwirtschaft, stated similarly. Their expert, Dr. Gibson, stated Bonderlube 235 was derived from the German practice, described in the 1942 publication, Mettallwirtschaft, of providing a water insoluble soap film on the phosphate coating to serve as the lubricant, by long soaking. Parker Rust Proof Company developed a similar coating more speedily by including a small amount of borax, approximately three percent of the soap, to control the pH (the acidity or alkalinity), thereby obtaining the formation of the water insoluble soap (zinc stearate) as an integral part of the phosphate coating, in a few minutes. Defendants contend the small amount of borax provides its long-known buffering function, which controls and maintains the aqueous soap solution within the narrow range of alkalinity that enables the water insoluble soap (zinc stearate) to form quickly on and with the zinc of the phos- [389] phate coating. They maintain that this is a use for borax which is neither suggested nor contemplated by the patent in suit, which rather contemplates the use of a large amount of borax to act as a meltable pigment to provide a glass-like lubricant.

Defendants state that Henricks, in his testimony, resorted to guessing and speculation respecting the amount of borax required for the Claim 4 process when soap borax lubricants are used over phosphate coatings, requiring an amount of borax sufficient to prevent formation of water insoluble soap; he was quoting the general cosmetic formulary of 1-5%, which amount is sufficient to prevent the insoluble soap, such as zinc stearate, from forming, but if it does form, the borax emulsifies it, cleansing it. His claimed invention was to prevent the formation of the water insoluble soap film, not for the contrary purpose of providing the insoluble soap film in-

tegral with the phosphate coating as the principal and chief lubricating agent. In Bonderlube 235, the small amount of borax, approximately three percent, the defendants cite as providing a buffer in the aqueous soap solution for the purpose of controlling the alkalinity of that solution within the range that promotes the forming of the water insoluble soap, zinc stearate, as an integral part of the phosphate coating, which is not disclosed by the patent, and contrary to Henricks' testimony. Bonderlube 235, developed prior to 1951, was prior to the issuance of either the original patent in 1952, or the reissue in 1955, making it further clear that the history of Bonderlube 235 does not afford proof that the patent achieved the unobvious.

The Court has no doubt whatsoever that Henricks' testimony respecting the amount of borax required in the [390] patented process was pure speculation and guesswork, finding no accurate foundation in the specifications or disclosures of the claim of the patent, but made with the desperate hope of saving an extremely broad claim.

The Court concludes that Claim 4 of the Reissue Patent No. 24,017 is invalid for several reasons. The all-encompassing breadth of the claim with a lack of specificity of proportions, coupled with the informative state of the prior art, both patented and published, as well as the prior public uses of which patentee was cognizant, impel a holding that patentee's stride forward in the art was not sufficient to merit a patent monopoly. Were it only for the breadth of the claim's scope, the Court might be hesitant, in view of *Binks Mfg. Co. v. Ransburg Electro-Coating Corp.*, 281 F. 2d 252 (1960) (Cer. Gr. 364 U.S. 926, Dismissed per curiam, 366 U.S. 211), to hold Claim 4 invalid. This Circuit's Court of Appeals (Judge Castle writing the opinion) there said at p. 257:

> "There is no requirement that quantitative values for such factors as voltage, spacing and liquid

> characteristics be recited. The fact that experimentation or the exercise of judgment is necessary to adapt a patented process to particular material or to obtain the particular results desired does not impair validity of the patent. *Lever Bros. Co. v. Procter & Gamble Mfg. Co.*, 4 Cir., 139 F. 2d 633-639."

But when that broad scope of the patent claim is considered in conjunction with the prior use at Briggs Body Company's plant, which prior use was participated in by patentee and so part of his awareness; and in conjunction with the disclosures of the Singer and Orozco patents (with the latter of whom Henricks was in one patent a co-patentee), the British patents, and the German publications, it appears to the Court that patentee is seeking unjustifiably to grasp for his own patented monopoly [391] that which was apparent or knowledgeable under the existing state of the art. The claim does not specify the kind of phosphate coating, the kind of meltable organic binding, and the kind of solid inorganic compound to be utilized, as well as not specifying the amounts and relative proportions of any such items. As defendants' proof showed, some processes could be conceived of ingredients of those classes which would not be workable. Several prior patents, some very old, and some cited publications, disclose borax as a lubricant. The fillers, such as borax, were said to be unctuous in their nature or slippery to touch. The prior patents also teach that phosphate coatings on metal are an aid in drawing, and, additionally, teach the lubrication of the coatings. Prior patents teach the use of soap for drawing metals. British and United States' patents teach the use of a dry film, the former with an organic binder with inorganic pigment. A prior publication taught that the addition of a filler such as borax could add to the film strength of a drawing lubricant, including soap. A British patent discloses that wear on tools is reduced by adding a pulverulent substance such as talc or litharge to the fat or oil lubricant. Talc is a pigment

which is the softest material on Mohs' scale, having a rating of one. Litharge is mentioned in the patent in suit as one of the meltable or fusible pigments. Borax was known prior to the time of the patent, as a buffer, and its specific pH values are indicated in chemical reference and handbooks. A British patent disclosed that it had been customary to use oils or fats and to mix them with certain substances such as talc or litharge for the purpose of increasing their efficiency; tallow is in the classification of such fats and [392] it is one of the oldest so known, and it was noted it solidifies at room temperature.

There can be no question that there can be patentable invention in the combination of known elements which effect an unexpected and useful result. Thus it was recently said in *Minneapolis-Honeywell Regulator Company v. Midwestern Instruments, Inc.*, decided November 29, 1961, by the Seventh Circuit Court of Appeals (Judge Duffy):

> "This Court has often applied the well-established rule of law that a novel combination of elements, whether all new, or all old, or partly new and partly old, which so cooperate as to produce a new and useful result or a substantial increase in efficiency, is patentable."

The result of the aggregation in the instant cause, however, does not to this Court give rise to the degree of novelty or unforeseeable result that was to be found in that case, although the feature of utility might possible be present. Both phosphate coating and the use of borax or its equivalent, and the use of soap were individually known in the drawing of metals. Their combined use is indicated to give even greater efficiency and ease in performing the same drawing operations they were theretofore used separately to perform (and in the prior public uses, used conjointly to perform).

The Court therefore holds Claim 4 of the Reissue Patent No. 24,017 invalid.

/s/ Edwin A. Robson,
Judge.

February 1, 1962.

[396] IN THE DISTRICT COURT
OF THE UNITED STATES.
* * (Captions — 56-C-1912 — 57-C-892) * *

FINDINGS OF FACT AND CONCLUSIONS OF LAW

[397] 1. (a) The above entitled suits were brought by plaintiffs for alleged infringement of United States patent Re. 24,017, dated June 7, 1955, for Method of Coating and Drawing Metal and Composition Therefor.

(b) By order of the Court dated November 19, 1959, the above entitled suits have been consolidated for trial upon the issue of the validity of claim 4 of the patent in suit, which is the only claim of the patent alleged in either suit to be infringed.

(c) The reissue patent in suit was issued to the alleged inventor, John A. Henricks, on an application filed and prosecuted by William Freeman, a patent attorney of Akron, Ohio. The patent was later assigned to the present plaintiff, Devex Corporation, of which the inventor Henricks is president, and then assigned by Devex Corporation to the plaintiffs, McCoy and TeGrotenhuis, the patent attorneys for Henricks and Devex Corporation, by conditional assignment subject to certain reversionary rights in Devex Corporation, for the purpose of enforcing the patent. This assignment was made after Henricks had tried personally to license the patent in the industry to no avail (R. 514).

[398] 2. (a) The patent in suit Re. 24,017 including claim 4 in issue is the outcome of an application, Serial 665,905, filed April 29, 1946, by the applicant and patentee, Henricks, for Metal Treatment and Composition for Same, which was abandoned in favor of a continuation-in-part application filed October 31, 1950, upon which later issued United States patent 2,588,234 dated March 4, 1952, and for which application for reissue was filed March 1, 1954, resulting in patent Re. 24,017 dated June 7, 1955, now in suit.

(b) The patent in suit is directed to lubrication of metal surfaces in cold drawing and deforming metal such as steel to desired form and shape by means of dies, representing the size, form and shape to be produced in the metal being worked. The use of lubricant between the contacting surfaces of the die and the metal being worked is necessary to reduce friction and prevent intimate contact between the die and the surface of the metal being worked to avoid scoring and tearing of the metal or galling of the dies, and prevent development by friction of sufficient heat at the place of contact or engagement to cause welding and seizure to occur between the die and the work.

(c) This is an old and well-known art, and methods and materials for lubricating the dies and the work have long been known and used.

[399] 3. The particular alleged improvement in issue in these cases which the patent defines in claim 4 in issue, is as follows:

> "The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed therethrough a solid inorganic compound melt-

able at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal."

[400] 4. The particular practice at issue in this suit which claim 4 is contended to represent and cover is the practice of providing a zinc phosphate coating on the surface of the steel to be deformed; applying to that phosphate coating an aqueous solution or emulsion of sodium tallow soap and borax; drying or allowing to dry on the phosphate coating the sodium tallow soap containing borax until it forms a fixed film, and thereafter drawing or deforming the steel.

It is alleged with respect to this practice that the sodium tallow soap provides the solid meltable organic material of the claim for binding in place the borax, which is alleged to be the solid inorganic compound of the claim meltable at a temperature below the melting point of the ferrous metal phosphate of the phosphate coating and having a hardness not exceeding 5 on Mohs' hardness scale.

Mohs' hardness scale is a known standard for indicating the relative hardness of materials. It is used in the claim as a specification that the "solid inorganic compound" of the claim shall not be hard enough to scratch the steel being drawn.

[401] 5. Processes and methods of drawing and deforming metal and lubricating compounds for use therein, shown by the prior art in evidence to have been known prior to the patent in suit, are as follows:

(a) Salts such as sodium borate or sodium meta phosphate applied to the drawing dies where the wire to be drawn enters the die so that during the drawing operation on the wire heated to fairly high temperature, the sodium borate or sodium meta phosphate melts to a viscous state and lubricates

the die aperture and the wire, or by leading the tungsten wire to be drawn through a bath of said substances, or by dusting the wire with said substances in the form of a powder so that in the subsequent heating of the wire the adhering substances are softened and are conducted together with the wire toward the die (Defendant's Exhibit 35, British Patent 11,439 of 1912 for Process of Hot Drawing Tungsten Wire).

The sodium borate and sodium meta phosphate are inorganic compounds meltable at a temperature below the melting point of ferrous metal phosphate and having a hardness not exceeding 5 on Mohs' hardness scale, as specified in claim 4 of the patent in suit.

(b) Water soluble soap compounds made by saponifying vegetable oils such as coconut oil, olive oil and palm oil, applied to the surface of the steel (sheet metal) at a temperature of 150° F. and allowed to dry out to form [402] a coating which will adhere to the metal during shaping or forming. The same or similar compound is used to lubricate the dies when the metal is being pressed to the desired shape (Defendant's Exhibit 36, Hopkins United States patent 1,769,577 of July 1, 1930). This soap is within the category of solid meltable organic material described in claim 4.

(c) In the process of cold drawing metal as in the manufacture of wires and tubing, a lubricant coating for the metal consisting of aluminum powder and nitro-cellulose suspended in a volatile liquid such as amyl acetate is applied to the surface of the metal to be drawn and dried thereon by evaporating the volatile solvent amyl acetate so that a fixed film or coating of nitro-cellulose containing the aluminum powder distributed therethrough is provided on the metal to serve as a lubricant during the drawing operation (Defendant's Exhibit 37, British Patent 367,198 of 1932).

In this coating the nitro-cellulose constitutes the solid meltable organic binding material containing distributed

therethrough the aluminum powder which is an element and provides an inorganic pigment meltable at a temperature below the melting point of ferrous metal and having a hardness not exceeding 5 on Mohs' hardness scale, within the specifications for melting temperature and hardness required by the patent in suit (Gibson R. 595-599).

(d) Tallow in its raw state, or combined in the form of soap with certain metals, such as calcium, sodium, potassium, lead, aluminum and zinc, with mineral oil and containing filler materials or pigments like chalk, soap- [403] stone, mica, rosin, graphite, fireclay, potters clay, borax, etc., were published as known drawing compounds (Defendant's Exhibit 38, Transactions of American Society for Steel Treating, Volume XXI, January 1933 — December 1933, p. 187, paragraph 1 — Tallow; p. 188, paragraph 4 — Fillers).

Tallow or tallow soap with the filler material borax is within the definition of claim 4 specifying a solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of ferrous metal and having a hardness not exceeding 5 on Mohs' hardness scale.

(e) Tallow or palm oil soap alone or combined with aluminum stearate were published as known drawing compounds for drawing wire, are meltable at a temperature below the melting point of ferrous metal and have a hardness not exceeding 5 on Mohs' hardness scale, within the definition of the corresponding language employed in claim 4 of the patent in suit (Gibson R. 665-669) (Defendant's Exhibit 54, publication Wire & Wire Products, issue of October 1931, pp. 393 and 394).

The tallow and palm oil soaps disclosed are within the definition of solid organic binding material in claim 4 of the patent in suit, and the aluminum stearate when combined

therewith would constitute a fusible pigment (patent in suit, column 9, Table 1 — Fusible Pigments) distributed therethrough.

[404] (f) In deforming steel by cold rolling, it was known to provide a lubricant between the rolling die and the steel being rolled and deformed to the desired shape, to prevent overheating of the dies, sticking of the metal and the dies, and scarfing or roughening of the surfaces of the metal. The material was made by preparing a dry mixture comprising 90% borax, 5% tri-sodium phosphate and 5% tallow soap dissolved in water in the proportion of 8 ounces of the dry mixture to each gallon of the solution, and applied either on the rolls or the metal stock or both, before or during the forming operation, so that during the forming operation the surfaces are sufficiently coated. This material was used in place of oils and greases and aqueous emulsions of oils and greases which are expensive and difficult to remove from the work after forming (Defendant's Exhibit 32, Orozco United States patent 1,982,065 dated November 27, 1934).

This material comprising borax and soap is substantially identical with the soap and borax materials disclosed in the patent in suit for use as a fixed film lubricant over phosphate coatings.

(g) Drawing lubricants made up to fat, such as tallow or palm oil, 75-85% saponified to provide soap, combined in the proportion of 20-35 parts by weight with mineral oil 30-50 parts by weight, and water 10-40 parts by weight, mixed to make up a paste having a consistency ranging from mayonnaise to heavy greases with which filler materials may be mixed to prevent metal-to-metal contact under [405] high pressures encountered in forging, stamping, drawing and the like, are disclosed in Defendant's Exhibit 45, Zimmer United States patent 2,258,309 dated October 7, 1941, column 1, lines 44-55, column 2, lines 1-17.

It is recommended (column 1, lines 8-44) that in place of filler materials of the type of talc, chalk, calcium carbonate and the like, filler materials such as salts of the phosphates, sulfides and borates of calcium, zinc, lead or tin be used to endow the lubricating compound with the ability to withstand higher pressures without metal failure, seizure or scoring and to reduce friction, facilitate the flow of metal into the die recesses and reduce the power requirements for the fabricating operations; and also to give the work an attractive burnished appearance which is not obtained by the well-known inert fillers, and reduce the frequency of splits, cracks or other blemishes in the drawings, forgings or stampings.

The saponified tallow disclosed in this patent is an organic binding material (namely, soap) corresponding to the organic binding material referred to in claim 4 of the patent in suit, and the fillers disclosed to be mixed in and used with it (namely, the zinc phosphate and the borates of calcium, zinc and lead) are solid inorganic compounds meltable at a temperature below the melting point of ferrous metal and having a hardness not exceeding 5 on Mohs' hardness scale, referred to in claim 4 of the patent in suit, and listed as such in the patent in suit in Table I — Fusible Pigments, column 9.

[406] 6. (a) It was well known in the art prior to the patent in suit on April 29, 1946, that it was a definite improvement and aid in cold drawing and deforming steel to provide the surface of the steel with integral phosphate coatings and apply lubricants over such coatings.

(b) The use of zinc phosphate coatings to which oil is applied as a lubricant in drawing and deforming steel tubes is disclosed in Defendant's Exhibit 42, British patent 496,866 of 1938.

(c) The drawing and deforming of steel provided with manganese phosphate coatings impregnated with oil or fat or

a mixture of oil and fat as a lubricant is disclosed in Defendant's Exhibit 41, British patent 494,830 of 1938.

With respect to lubricants that had been known for use in drawing operations, this patent also discloses (column 1, lines 14-22):

> "It is known to treat iron pipes, in particular, prior to a drawing process, with fats or oils, or to precipitate deposits thereon, in order to soften the surface and to reduce the wear on the drawing tools. It has also been the practice to mix the oil or fat with pulverulent substances, such as talc or litharge, for the purpose of increasing its efficiency."

The fats disclosed in this patent include fats such as tallows, of which many are known to be solid at room temperature, and the litharge (lead oxide), which the patent states it had been the practice to mix with the oil or fat for the purpose of increasing its efficiency. There is thus disclosed a composition providing a solid meltable organic binding material (namely, fats known to be solid at [407] room temperature) containing distributed therethrough a solid inorganic compound (namely, the litharge) meltable at a temperature below the melting point of ferrous metal and having a hardness not exceeding 5 on Mohs' hardness scale, all within the definition of the corresponding language employed in claim 4 of the patent in suit. Lead oxide (litharge) is specifically listed in the patent in suit, column 9, Table I, under fusible pigments suitable for use as a solid inorganic compound meltable at a temperature below the melting point of ferrous metal phosphate and having a hardness not exceeding 5 on Mohs' hardness scale, called for by the corresponding language in claim 4 of the patent in suit (Gibson R. 617-623).

The British patent 494,830 therefore contains disclosure of a lubricating composition for drawing and deforming ferrous

metal within the broad terminology employed in claim 4 of the patent in suit.

(d) Defendant's Exhibit 39, United States patent 2,105,015 to Singer, dated January 11, 1938, particularly discloses and recommends the use of phosphate coatings on the steel to be drawn lubricated with known methods of lubrication as a definite improvement and aid in drawing and deforming ferrous metal such as steel. It states, column 2, lines 53-55; page 2, column 1, lines 1-14:

> "Satisfactory processes for applying such coatings are well known in the art, such for example as the so- (page 2, column 1, lines 1-14) called Parkerizing process. They comprise treatment of the article with a heated dilute aqueous solution of phosphoric or oxalic acid which may or may not contain phosphates [408] or oxalates of iron, manganese, zinc or other metals in solution. Thereby there is formed on the article a dense thin crystalline coherent and tightly adherent coating of salts of phosphoric or oxalic acid which combines both chemically and physically with the metal of the base. Such a coating adapts the article admirably to mechanically working and reduces or eliminates the troubles arising from the contact of the article with the working element."

It also states, page 1, column 2, lines 22-33:

> "Although the coating thus formed may properly be considered a lubricant, as contrasted with a coating applied for some other purpose, as for example, increasing the rust or corrosion resisting properties of the metal, it should be fully understood that it is not a lubricant in the customary or ordinary sense, for the reason that the well known, present day

methods of lubrication may also be used in conjunction with the practice of the present process, and in many instances will be an essential factor in obtaining proper results."

The patent also states, page 2, column 1, line 51, and column 2, lines 1 et seq.:

"The use of coatings of the kind herein described (column 2, lines 1 et seq.) permits what might be termed deep, severe or even almost excessive reduction rates, as well as a series of normal reductions without the customary intermediate annealing operations.

"In the practice of the invention at least those surfaces of the article which are to be in contact with the working element are provided with a coating of the type described, and the article is then worked in the customary manner, no change in procedure or tools being necessary. Such coatings are considerably cheaper than the coatings of soft metals heretofore applied, and if not already removed during the working operation they can be removed completely much more readily than the metallic coatings, as for [409] example, by simple pickling operations. In many instances no further removal of the coating is necessary after working, either because it has been substantially removed during the working operation or that portion which remains does not interfere with the use to which the article is subsequently applied."

(e) The efficacy of lubricated phosphate coatings as a definite improvement and aid in drawing and deforming steel is further evidenced and made known in the prior art.

Defendant's Exhibit 51, the publication Korrosion Und Metallschutz of June 1941, and translation, discloses the use of zinc phosphate coatings (pp. 3-4) lubricated with boring oil emulsions (p. 4) as lengthening the life of the drawing tools, reducing friction in the forming process, increasing the reduction and drawing speeds, and reducing the number of drawing operations (p. 7).

Defendant's Exhibit 52, the publication Metallwirtschaft of 1942, and translation, discloses (p. 11) improvements in drawing and deforming operations on iron and steel coated with zinc phosphate coatings which are lubricated by having formed thereon water insoluble soap films.

This is also disclosed in Defendant's Exhibit 53, the publication Stahl Und Eisen of 1942, and translation (p. 7).

[410] 7. Lubricated zinc phosphate coatings on steel were known and used as a successful aid in drawing and deforming steel cartridge cases in this country in 1942 and 1943. An operation of this kind was carried on by the Buick Motor Division of General Motors Corporation in 1942 and 1943 and was described and published in Defendant's Exhibit 48, American Machinist issue of May 13, 1943 (Shultz R. 644-650).

A similar operation was carried on in drawing and deforming steel to make steel cartridge cases by Briggs Manufacturing Company at Detroit, Michigan, in 1943, where zinc phosphate coating was applied to the steel to be drawn and a grease was applied as a lubricant over the zinc phosphate coating (Tousley Deposition, pp. 31-32; Henricks Deposition, pp. 22-23).

Northern Engraving & Manufacturing Company of La Crosse, Wisconsin, in 1943 manufactured 20-mm. steel cartridge cases or shells by drawing and deforming zinc phosphate coated steel over which was applied a lubricant made up of sodium stearate, stearic acid and water with

sulfur distributed therethrough (Depositions of Wayne G. Dickinson and Lew F. Scott). As received, the lubricant material was semiliquid, not liquid enough to pour. It was applied hot. It did not become a hard solid after drying, but formed a waxy type of film on the phosphate coating which was plastic and easily movable with the finger (Depositions of Wayne G. Dickinson and Lew f. Scott, pp. 19-20, 24-25, 27, 37, 54, 59-60).

[411] 8. In 1942 and 1943 the Gilron Products Company of Cleveland, Ohio, with whom the patentee of the patent in suit, Henricks, was associated, first as consultant in 1942 and then as an employee from 1943 to 1945, manufactured and marketed lubricant compositions under the trade name Drawcote, for use in drawing and deforming steel, and which were extensively sold and used in 1942 and 1943 and subsequently, in drawing and deforming steel.

These lubricant compositions consisted principally of sodium soaps formed from tallow and palm oil, and of borax. The soap comprised from 10-33% by weight and the borax comprised from 67-90% by weight, of the compositions.

This material was produced in the form of a dry powder based upon and derived from the knowledge and previous experience of Gilbert H. Orozco, who with one Roland Whitbeck comprised the partnership under the name of Gilron Products Company, which was later incorporated under the same name as an Ohio corporation.

Gilbert H. Orozco is the patentee of United States patent 1,982,065 dated November 27, 1934, Defendant's Exhibit 32, which discloses the use of a dry mixture comprising borax 90%, trisodium phosphate 5% and tallow soap 5%, applied in aqueous solution in the operation of deforming steel by cold rolling to provide a lubricant coating between the rolling die and the surface of the metal being rolled and deformed to

prevent overheating of the dies and consequent sticking of the material being rolled and the [412] dies, and to prevent scarfing or roughening of the surface of the metal being worked upon.

The compositions that were manufactured and sold by Gilron Products Company in 1942 and 1943 and subsequently under the trade name Drawcote were in the form of dry powder composed principally of sodium soap and borax in the proportions by weight of 10-33% soap to 67-90% borax.

This dry powder was applied by the user in drawing metal by making a heated emulsion or solution of the soap-borax powder in water, applying it hot to the surface of the metal to be drawn, and either drying or allowing it to dry as a fixed film on the surface of the metal by evaporation of the water therefrom.

Drawcote was extensively sold and successfully used in 1942 and 1943 in the cold drawing and deforming of steel, and especially in the cold drawing and deforming of steel in the manufacture of steel cartridge cases (Henricks R. 338-363).

[413] 9. Prior to filing the first application for the patent in suit on April 29, 1946, and while still employed by Gilron Products Company, the patentee of the patent here in suit, Henricks, jointly with Gilbert H. Orozco of Gilron Products Company, filed application for United States patent on August 2, 1943, Serial 497,117, which resulted in the grant of United States patent 2,469,473 on May 10, 1949 (Defendant's Exhibit 1) and in the grant upon a division of the same application of United States patent 2,530,837 dated November 21, 1950 (Defendant's Exhibit 2). These applications and patents were assigned to Gilron Products Company.

These applications and the patents disclose and claim as invention both the use of soap-borax lubricants in drawing steel, and soap-borax lubricant as a composition, which were

being sold by Gilron Products Company in 1943 under the trade name Drawcote and used extensively by the public in the year 1943 and subsequently in drawing and deforming ferrous metal. As the subject matter of invention it was claimed in these patents that the soap-borax lubricants provide what is termed stepwise lubrication in the process of drawing and deforming ferrous metal. That is to say, the soap-borax composition applied as a dry film to the surface of the ferrous metal to be drawn and deformed provided lubricating materials having different melting points so that in the process of drawing, the soap of the composition, having the lower melting point, would, by melting first under the pressure and heat generated in the drawing operation, provide initial lubrication between the metal being drawn and the drawing die, and when [414] temperatures were reached in the drawing operation at which soap would cease to provide lubrication, the borax, having the higher melting point, would remain as a barrier preventing contact between the die and the metal being worked and would eventually melt and provide a fluid or plastic glasslike film of borax to continue to provide a barrier between the die and the metal being worked and a lubricant during the higher and ultimate temperatures reached in the drawing operation.

The purpose, object and operation are identically described in both patents, in patent 2,469,473 in column 3, lines 59-74, and in patent 2,530,837 in column 3, lines 40-55, as follows:

> "A specific object of the invention is to provide an improved method of treating metals preparatory to the cold drawing or forming thereof in order to insure both stepwise cooling and stepwise lubrication of the metal. That object is accomplished, for example, by coating the surface of the metal to be worked with a composition, the ingredients of

> which will act progressively and successively both as coolants and as lubricants when the coating is subjected to the extreme pressures incident to drawing or forming operations and temperatures approaching the melting point of the worked metal or, in the case of a non-metallic tool or die, the point at which such working element might be damaged by working that particular metal."

It is further stated in these patents, in patent 2,469,473 in column 9, lines 12-32, and in patent 2,530,837 in column 8, lines 71-75, and column 9, lines 1-16:

> "Further to explain the operation of the process it will be seen that by the incorporation of sodium tetraborate (borax) with high titre soap we have a naturally [415] slippery composition, the borax of which melts at 75° C., gives up its water of crystallization at 200° C. and intumesces at that temperature to form an impalpable powder. The powder so formed after intumescence could be considered analogous to a solid filler in known types of lubricant; but said powder has, in addition, an important physical property. At 741° C. the intumesced borax becomes fluid and thereby serves to lubricate the metal being worked. Similarly the higher secondary melting point glass forming substances, following dehydration and intumescence, become fluid lubricants at respective increased temperatures and those added ingredients and the proportions thereof are selected so as to fill in any gaps that may occur, that is to bridge over from one temperature range to another."

These patents also state, in patent 2,469,473, column 6, lines 72-75, and column 7, lines 1-3, and in patent 2,530,837, in column 6, lines 54-60, as follows:

> "We have noted particularly that when boric acid or borax are used in the composition the hydrated colloids remain on the worked metal as an amber colored soluble substance which remains slippery to the touch and has no appearance of having been carbonized or polymerized and is readily removed in H_2O."

These patents also attribute greatly increased die life to the soap-borax lubricants where they state, in patent 2,469,473, column 8, lines 71-75, column 9, lines 1-6, and in patent 2,530,837, in column 8, lines 55-65:

> "As an instance of the efficiency of the present process, finishing dies for drawing stainless steel wire containing chromium, nickel and titanium and formerly producing a maximum of twenty-five pounds of wire, by the use of the present composition, were able to [416] produce from 180 to 250 pounds. We might mention that we produced with the present process a 30% increase in die life in the drawing of steel shell casings where a copper coating had previously been used in order to protect the dies."

[417] 10. Henricks, the patentee of the patent in suit Re. 24,017, in 1945 left the employ of the Gilron Products Company where he had participated in and was familiar (1) with the sale of the soap-borax lubricants described in the patents 2,469,473 and 2,530,837 and (2) with the public use of those lubricants in drawing and deforming steel in the year 1943 and subsequently, and (3) knew also in 1943 that lubricated phosphate coatings were in public use in drawing and deforming steel. On April 29, 1946, Henricks as sole inventor filed the first of his applications which resulted in the patent in suit Re. 24,017. This was two years and eight months after August 2, 1943, when he had joined as co-inventor with Gilbert Oroz-

co in filing the application which resulted in patent 2,469,473 and 2,530,837, which were assigned to Gilron Products Company.

The patent in suit proposes the use of the self-same stepwise lubrication (in column 8, lines 45-75, and column 9, lines 1-18) with the identical soap and borax lubricants which are disclosed in the prior patents 2,469,473 and 2,530,837. The patent in suit in column 15, lines 51-52, recommends the type of lubricant disclosed in patent 2,469,473, and at line 66 recommends the type of lubrication disclosed in the Whitbeck patent 2,470,062, both of which are admitted to have been widely sold and in public use in 1943 (Henricks R. 357-358, 362-363, 376-377, 381-382).

The alleged improvement of the patents in suit is to apply these Drawcote lubricants upon steel provided with known iron or zinc phosphate coatings (patent in suit, column 8, lines 55-75, column 9, lines 1-15, column 7, lines 40-45 and 55-75).

[418] 11. In answer to defendant's interrogatories 17-21 prior to trial respecting what plaintiffs' contention would be at the trial concerning chemical reaction or reactions (a) between the phosphate coating and the soap; (b) between the phosphate coating and the borax; (c) between the phosphate coating, the soap and the borax; (d) other than the reactions identified in answer to (a), (b) and (c), plaintiffs stated in their answer to interrogatory 21:

> "The X-Ray diffraction tests indicate that certain known compounds are formed. They also indicate by peaks that certain other unknown or unidentified compounds are formed. Plaintiffs will, therefore, contend that chemical reactions do occur but are unable to specifically describe them and will not contend, at the trial of this cause, that any specific chemical reactions occur."

[419] 12. Plaintiffs alleged at trial that compounds other than zinc phosphate and the borax are formed by chemical reaction of borax with soap and the zinc phosphate of the phosphate coating, and are essential to the successful operation of the process described in claim 4 of the patent in suit.

The patent in suit does not describe any chemical reactions in the drawing operations with soap-borax applied over phosphate coatings which produce or require the production of any other compounds to be essential to successful drawing operations; claim 4 of the patent in suit contains no reference to or requirement of the presence of such other compounds in the operation of the process defined by the claim.

The other compounds alleged to be produced by a chemical reaction of the borax in the coating and the phosphate of the coating were not identified with certainty by or in the X-ray diffraction patterns produced. Plaintiffs' Exhibits 22, 23, 24 and 25 (R. 191-210, 543-558).

It was admitted that no quantitative values or amounts of the compounds alleged to have been formed by chemical reaction of the borax and alleged to be present could be determined from the X-ray diffraction patterns (R. 243-245). There is no evidence that the compounds alleged to have been formed by chemical reaction of the borax and to have been present in the samples tested were present in any significant quantity or had any controlling or significant effect in the drawing operations.

[420] 13. Henricks in his testimony at the trial (R. 416-421) attempts to predicate the invention of the patent in suit upon the borax in the soap-borax lubricant as mineralizing the phosphate of the coating, likening it to mineralization and metamorphosis in mineralogy by which coarse stone like limestone under the heat and pressure becomes marble or a carbonaceous deposit becomes graphite or a pyroxene rock

becomes mica; that the conception of the patent was to make this metamorphosis get rid of the highly abrasive phosphate; that the metamorphosis and the mineralizing approach is what he centered upon, to put in the lubricant film a flux agent, so that it is no longer a hard, abrasive, sandpaper bed, but one that will melt and flow into a glass, that that is invention he swore the oath to.

He admits that nothing of this alleged theory and teaching is contained in the patent in suit Re. 24,017 (R. 447, 503-504).

It appears that there was no subject matter relating to alleged metamorphism, fluxing and mineralizing in Henrick's original application Serial 665,905, filed April 29, 1946 (Plaintiffs' Exhibit 2); that such subject matter first appeared in Henrick's second application Serial 193,290, filed October 31, 1950 (Plaintiffs' Exhibit 3), at pages 27-31 of that application; and that all of this subject matter and the claims relating thereto was cancelled out of the application by supplemental amendment made October 25, 1951 (Plaintiffs' Exhibit 3, page 100) where page 27 of the application from line 10 through and including [421] line 23 of page 31 of the application was cancelled.

At page 104 the claims of the application relating to the alleged metamorphism, fluxing and mineralizing were cancelled, and at pages 104-105 of Plaintiffs' Exhibit 3, applicant's attorney stated (page 104):

> "At the interview of September 17, applicant's attorney understood that the Examiner's position was as follows: * * *"

and at page 105:

> "5. Claims 13-20 relating to applicant's mineralizer flux concept for lower melting eutectic mixtures was a separate invention and should be divided out of this application."

and at page 108:

> "Applicant has also cancelled without prejudice subject to a continuation-in-part application references in the specification to his metamorphism and mineralizer invention."

Nothing appears in the application for the reissue patent in suit Re. 24,017 (Defendant's Exhibit 65) relating to or concerning this alleged metamorphism, fluxing and mineralizing, and nothing appears in the patent in suit Re. 24,017 regarding it.

It thus appears that if the applicant Henricks made any invention predicated or based upon alleged metamorphism, fluxing and mineralizing, it has been removed and forms no part of the alleged invention disclosed in the patent in suit or claimed in claim 4 in issue here.

[422] 14. In the early part of 1943 the Briggs Manufacturing Company in Detroit, Michigan, was manufacturing 75-mm. steel shell cases by drawing and deforming operations using zinc phosphate coated steel with grease applied as a lubricant over the zinc phosphate coatings.

About June 1943, Whitbeck of Gilron Products Company sold the Gilron Products soap-borax Drawcote lubricant to the Briggs Manufacturing Company for use in drawing and deforming the steel shell cases.

Briggs Manufacturing Company used the soap-borax Drawcote lubricants during the summer and fall of 1943 in the production of steel shell cases.

In the shell case drawing operations at Briggs Manufacturing Company there were six drawing and deforming operations performed on each shell case to produce the final form. Prior to each of four of these drawing operations a zinc phosphate coating was applied to the shell case, and the shell

cases were then lubricated at the drawing press by applying grease to the phosphate coatings.

In using the Gilron Products soap-borax Drawcote lubricants the Briggs Manufacturing Company began by applying the Drawcote lubricant upon the phosphate coatings, in place of the grease previously used, prior to each of the four drawing operations and found it to operate successfully.

During the course of the summer of 1943 the four operations of phosphate coating the steel shell cases before [423] applying the Drawcote lubricant were eliminated by gradually reducing the number of phosphate coating operations employed, until finally all four phosphate coating operations on the steel shell cases had been eliminated and the Drawcote lubricant was thereafter applied to the bare steel shell cases.

During this interval of gradually eliminating the phosphate coatings and while the Drawcote lubricant was being used over phosphate coatings, shell cases were being produced at the rate of 5 or 6 thousand cases per day.

The phosphate coating operations were eliminated for the purpose of speeding up the production of the shell cases and reducing cost of the drawing operations, and not because the steel shell cases were not being successfully drawn with the phosphate coatings and with the soap-borax Drawcote lubricants applied to the phosphate coatings (Francis M. Tousley deposition; Harold F. Brown deposition).

[424] 15. Claim 4 of the patent in suit describes and claims no more than was known and successfully demonstrated and used by the Briggs Manufacturing Company in 1943 in using the Drawcote soap and borax lubricants, namely, the process of working ferrous metal (the steel being made into shell cases by drawing and deforming at Briggs Manufacturing Company in 1943) which comprises forming on the surface of the metal a phosphate coating (the zinc phosphate coating ap-

plied on the surface of the steel being made into shell cases by Briggs Manufacturing Company in 1943) and superimposing thereon a solid meltable organic binding material (the Gilron Products Drawcote lubricant which contained sodium tallow soap) containing distributed therethrough a solid inorganic compound (the borax contained in the Drawcote lubricant applied to the zinc phosphate coated steel shell cases at Briggs Manufacturing Company in 1943) meltable at a temperature below the melting point of the ferrous metal phosphate (and also below the melting point of the zinc phosphate, which is below the melting point of ferrous phosphate, patent in suit, column 9, Table I) of said coating and having a hardness not exceeding 5 on Mohs' hardness scale, and thereafter deforming the metal.

[425] 16. The date of invention relied upon by Henricks and plaintiffs for claim 4 of the patent in suit in issue is April 29, 1946, the date of the filing of the first application Serial 665,905 by the applicant and patentee Henricks, plaintiffs' answer to defendant General Motors' interrogatory 13, as follows:

(Defendant's Interrogatory 13):

> "State the date upon which plaintiffs will rely at the trial of this cause for the making of the alleged invention described in claim 4 of the United States Letters Patent Reissue No. 24,017, dated June 7, 1955, by the applicant for said patent, John A. Henricks."

(Plaintiffs' Answer to Interrogatory 13):

> "Assuming that no additional prior art or prior uses will be cited against Reissue Patent 24,017, plaintiffs will rely upon April 29, 1946 as the date upon which the invention of Patent 24,017 was made."

[426] 17. The plaintiffs and Henricks admit that at Briggs Manufacturing Company in Detroit, Michigan, in 1943, in the manufacture of 75-mm. steel cartridge cases by drawing and deforming steel, the Gilron Products soap and borax lubricant Drawcote was used over phosphate coated steel, and do not deny that such use occurred before the invention of claim 4 of the patent in suit Reissue 24,017 by the applicant Henricks (Defendant's Interrogatory 8; Plaintiffs' Answer to Interrogatory 8; Defendant's Interrogatory 11; Plaintiffs' Answer to Interrogatory 11):

(Defendant's Interrogatory 8):

> "Do plaintiffs deny that in the year 1943 Briggs Manufacturing Company at Detroit, Michigan, manufactured steel cartridge cases for the United States Government by drawing and deforming the steel material into the form of 75-mm. cartridge cases; that in the said manufacturing operations the surface of the steel material, prior to being drawn and deformed, was provided with a phosphate coating, and that there was superimposed on said phosphate coating a lubricant composition comprising by weight: soap 15%, borax 40%, boric acid 20%, potassium carbonate 25%, which formed a fixed film on said phosphate coating comprising a solid meltable organic binding material (namely, soap) containing distributed therethrough a solid inorganic compound (namely, borax) meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on Mohs' hardness scale, and that the said coated steel material was drawn and deformed to produce 75-mm shell cases?"

(Plaintiffs' Answer to Interrogatory 8):

> "Plaintiffs admit that, at Briggs Manufacturing Company at Detroit, Michigan, in 1943 in the manu- [427] facture of 75 mm. cartridge cases, there was a casual fortuitous use of a soap and borax lubricant over a phosphate coating in connection with the manufacture of a small number of cartridge cases. No one at Briggs Manufacturing Company or anywhere else learned anything from this activity. Plaintiffs deny anything beyond this point and specifically deny that this activity constituted a prior public use within the meaning of 35 U.S.C. 102 (b)."

(Defendant's Interrogatory 11):

> "Do plaintiffs deny that the operations at Briggs Manufacturing Company in the year 1943, stated in interrogatory 8 above, occurred before the alleged invention described in claim 4 of the United States Letters Patent Reissue No. 24,017, dated June 7, 1955, by the applicant for said patent, John A. Henricks?"

(Plaintiffs' Answer to Interrogatory 11):

> "No."

[428] 18. The evidence shows that Whitbeck of Gilron Products Company and the applicant for the patent in suit in demonstrating the utility of the Gilron Products soap-borax Drawcote lubricants and in promoting use over bare steel without undercoatings, followed a procedure of first demonstrating that such lubricants would operate successfully when applied to the undercoatings, such as copper undercoatings and phosphate undercoatings (Henricks deposition prior to trial, pp. 18, 19, 21, 22, 23; testimony at trial, R. 387-390).

[429] 19. The evidence further shows that in 1943 and during the time of the employment there of Henricks, the applicant for the patent in suit, Gilron Products Company regarded it to be to its financial interest and benefit in promoting the sale and use of the soap-borax Drawcote lubricants to also promote and advocate the elimination of the use therewith of phosphate undercoatings, which were then known to be in use with other lubricants applied thereto in drawing and deforming steel (Henricks deposition prior to trial, pp. 45 and 48).

[430] 20. The evidence of record establishes that the Drawcote soap-borax lubricants were used successfully in drawing the zinc phosphate coated steel shell cases at Briggs Manufacturing Company in 1943. That the use was known to the Briggs Manufacturing Company personnel and was public and was known to and participated in by Whitbeck of Gilron Products Company and by Henricks, the patentee of the patent in suit, who was then in the employ of Gilron Products Company. That the use was in and during the normal course of production of the steel shell cases and continued for a substantial period. That the Briggs Manufacturing Company established successful use of the Drawcote soap-borax lubricants when applied over the phosphate coatings in the normal course of production of steel shell cases before it established that the Drawcote soap-borax lubricants could be used in production successfully without the phosphate coatings.

[431] 21. The Northern Engraving & Manufacturing Company of La Crosse, Wisconsin, from about the end of 1942 until past the middle of 1943, manufactured 20-mm. steel cartridge cases or shells by drawing and deforming zinc phosphate coated steel over which was applied a wax like lubricant made up of sodium stearate and stearic acid with sulfur distributed therethrough, as described in Finding 7. This production obtained a magnitude of approximately

50,000 cartridge cases per day (Depositions of Wayne G. Dickinson and Lew F. Scott).

Sulfur is one of the fusible pigments listed in the patent in suit Re. 24,017, column 9, Table I — Fusible Pigments. The patentee, Henricks, considers sulfur to be an inorganic pigment within the terminology of claim 4 of the patent in suit (Henricks, R. 513-514).

[432] 22. Of the prior art patents and publications referred to heretofore in Findings 5 and 6, the Patent Office had called to its attention and considered during the course of the prosecution in the Patent Office of the various applications which resulted in the patent in suit and in the allowance of claim 4 thereof in issue, the following:

The prior British patent 367,198 of 1932, Defendant's Exhibit 37, which discloses the use in drawing and deforming steel of a fixed lubricant film of nitro-cellulose with powdered aluminum distributed therethrough;

The United States patent to Zimmer 2,258,309 of October 7, 1941, the Defendant's Exhibit 45, which discloses lubricants for drawing and deforming steel composed of a paste comprising soap, mineral oil and water, and that fillers, such as zinc and calcium phosphate and the borates of calcium, zinc and lead, may be used therein;

The British patent 496,866 of 1938, Defendant's Exhibit 42, which discloses the use in drawing and deforming steel of a zinc phosphate coating applied to the surface of the steel and lubricated with oil;

The Orozco and Henricks United States patent 2,469,473, application filed August 2, 1943, patent granted May 10, 1949, Defendant's Exhibit 1, which discloses the use of soap-borax lubricants referred to and recommended for use by the patent in suit Re. 24,017, applied as fixed film on the surface of steel, in drawing and deforming steel.

[433] The Patent Office is not shown to have had called to its attention or to have considered:

The Transactions of the American Society of Steel Treating, Volume XXI, January 1933-December 1933, Defendant's Exhibit 38, disclosing that lubricants composed of tallow soap having mixed therewith filler materials, among which borax is named, were known as lubricants for use in drawing and deforming steel;

The publication Wire & Wire Products issue of October 1931, Defendant's Exhibit 54, disclosing that it was known to use tallow or palm oil soap combined with aluminum stearate as a drawing compound in drawing wire;

The British patent 494,830 of 1938, Defendant's Exhibit 41, disclosing that it was known in drawing and deforming steel to coat the steel with manganese phosphate coatings and to lubricate the phosphate coating with oil or fat, and disclosing that it was also known to mix the oil or fat with litharge (a lead oxide listed in the patent in suit Re. 24,017, column 9, Table I, as a fusible pigment suitable for use in the lubricant materials of the patent in suit) for the purpose of increasing its efficiency;

The United States patent 2,105,015 to Singer, Defendant's Exhibit 39, disclosing and recommending the use in drawing and deforming steel of phosphate coatings, including zinc phosphate, and recommending that the known methods of lubrication be used therewith;

[434] The publication Korrosion und Metallschutz of June 1941, Defendant's Exhibit 51, disclosing that it was known that the use of lubricated zinc phosphate coatings was a definite aid and improvement in drawing and deforming steel as lengthening the life of the drawing tools, reducing friction in the forming process, increasing the reduction and drawing speeds, and reducing the number of drawing operations;

The publication Metallwirtschaft of 1942, Defendant's Exhibit 52, disclosing improvements in drawing and deforming on iron and steel coated with zinc phosphate coatings lubricated by having water insoluble soap films formed thereon.

It is not shown to have been known to the Patent Office that the process of drawing and deforming steel coated with a zinc phosphate coating with the soap and borax Drawcote lubricants applied thereto was known and used successfully in 1943 by the Briggs Manufacturing Company.

It is not shown to have been known to the Patent Office that the process of drawing and deforming steel provided with a zinc phosphate coating and having applied thereto a waxlike film of sodium stearate and stearic acid with sulfur distributed therethrough was known and used successfully in 1942-43 by the Northern Engraving & Manufacturing Company of La Crosse, Wisconsin.

[435] 23. The function of a phosphate coating in drawing operations is to form on the metal surface a dense, thin, crystalline, coherent and tightly adhering coating of salts of phosphoric acid which will provide barrier material to separate the drawing die from the metal being worked and prevent scoring and galling engagement between the die and the metal being worked, and will provide a surface for retaining in place the lubricant applied to it (United States patent to Singer 2,105,015, Defendant's Exhibit 39; British patent 494,830, Defendant's Exhibit 41; British patent 496,866, Defendant's Exhibit 42).

[436] 24. The function of a dry film lubricant in drawing operations is the same whether the dry film lubricant is applied directly to the surface of the ferrous metal or is applied over a phosphate coating on the ferrous metal (Houdaille Request for Admission 10, filed November 7, 1960, which stands

unanswered and therefore is admitted by plaintiffs; and Henricks deposition, p. 50).

[437] 25. The use of lubricated phosphate coatings in drawing and deforming metal was clearly taught and disclosed in the British patent 496,866 of 1938, Defendant's Exhibit 42, and in the British patent 494,830 of 1938, Defendant's Exhibit 41.

The combination of a phosphate undercoating with the then "present day methods of lubrication" was taught and described by the Singer United States patent 2,105,015 of January 11, 1938 (Defendant's Exhibit 39).

The soap-borax Drawcote dry film type of lubricant was one of the methods of lubrication well known and in public use in 1943, more than two years prior to April 29, 1946, the date of filing of the application for the patent in suit (Henricks R. 338-363). Its combination with a phosphate undercoating for providing lubrication and further protection to the surfaces of the work and the dies was therefore obvious to a person having ordinary skill in the metal drawing art in view of the teachings and disclosures of the above prior art in 1943, more than two years prior to the time, April 29, 1946, that the plaintiffs rely upon for the making of the alleged invention of claim 4 of the patent in suit.

[438] 26. The patent in suit, in so far as the alleged uses of the soap-borax lubricants by defendants in the cases at bar are concerned, contains no disclosure or teaching other than (column 15, lines 50-52, lines 67-68, and column 9, lines 1-15) to apply to phosphate coatings the soap-borax lubricants disclosed in the Orozco and Henricks patent 2,469,473 (Defendant's Exhibit 1) and the soap-borax lubricants disclosed in the Whitbeck patent 2,470,062 (Defendant's Exhibit 3), admittedly in prior public use in 1943, more than two years prior to the filing of the first application for the patent

in suit. This use was admittedly demonstrated and successfully made at and by the Briggs Manufacturing Company in 1943. This use of the soap-borax lubricants was successful, and while now alleged by plaintiffs to have been experimental, there is no evidence that any further experiment was necessary or required to successfully perform and utilize the process defined in claim 4 in issue, which in so far as the process alleged to be employed by defendants in these cases is concerned, is simply to provide a phosphate coating on steel and to apply to it the soap-borax lubricants on sale and in public use in 1943 and known and available and demonstrated as effective drawing lubricants in 1943 both when applied to phosphate coated steel and to steel without the phosphate undercoating.

[439] 27. The evidence establishes that in 1943 and for more than two years prior to the time, April 29, 1946, the date relied upon by plaintiffs in this case for the making of the invention of claim 4 of the patent in suit, the differences between the subject matter sought to be patented in claim 4 and the prior art were such that the subject matter as a whole would have been and was obvious to persons having ordinary skill in the art of drawing and deforming steel.

[440] 28. Claim 4 of the patent in suit is indefinite and fails to particularly point out and distinctly claim, as required by the Patent Act, 35 U.S.C. Section 112, the subject matter which applicant regards as his invention.

With respect to the use of borax as the solid inorganic compound of the claim, in answer to defendant's interrogatory 16:

* * *

"State the minimum and the maximum proportions of borax and soap that plaintiffs will contend

> at the trial of this cause to be within the scope, of the said claim 4 of said reissue patent."

plaintiffs answered as follows:

* * *

> "Plaintiffs will make no contentions and cannot speculate as to the minimum and maximum proportions of borax and soap which might be within the scope of claim 4 of Reissue Patent No. 24,017 because all circumstances must be evaluated and considered."

At the trial the patentee Henricks speculates (R. 468-504) with vague references to unidentified literature regarding mineralogy and cosmetics, without being able to define any minimum or maximum amount of borax required, and his final summation of the matter leaves the question wholly indeterminate and indefinite (R. 501, 503, 504).

Claim 4 says nothing whatever about the amounts or proportions of "solid meltable organic binding material," or the amounts or proportions of "solid inorganic compound."

As written, the claim includes as "solid meltable organic binding material" all of the multitude of compounds mentioned in the patent and others that could be selected [441] from the tables and literature which could be regarded as organic — capable of becoming solid — and meltable. It is alleged in this case to include also sodium stearate soap, which is listed in the standard chemical handbooks as an *inorganic* material (Dr. Gibson, R. 794-796, 803-808, 810-812).

As written, the claim includes as "solid inorganic compound" all compounds listed in column 9, Table I — Fusible Pigments, in the patent in suit, which could be selected from the tables and literature and which would melt below the melting point of ferrous phosphate and have a hardness less than 5 on the Mohs' hardness scale.

The claim contains no limits or instructions as to the proportions of such compounds that would be operable to carry out the alleged process invention stated by the claim.

The claim does not specify or call for the alleged mineralizing, metamorphizing or fluxing of the phosphate of the coating to form glass, or for the alleged emulsifying of the residual coating or film left after drawing.

There is no evidence that all of the materials includable within the terminology of the claim would perform the alleged functions.

No one could determine otherwise than by extensive experiments whether all or how many of the compound includable within the terminology employed could be used, or in what mixtures or proportions they could be used, nor whether they would accomplish the alleged mineralizing, metamorphizing or fluxing.

[442] The claim does not particularly point out and distinctly claim the alleged invention, i.e., emulsifying or mineralizing, metamorphizing and fluxing, that Henricks, (R. 421) states he swore the oath to. All such matter was cancelled from the application for the patent (Finding 13).

Henricks considers sulfur to be an inorganic pigment within the terminology of claim 4, and admits that it performs none of the alleged glass forming mineralizing functions of borax, and is of no help in cleaning effect (R. 513-514).

[443] 29. Henricks, the patentee of the patent in suit, testified that his invention in the use of borax as the solid inorganic compound specified in claim 4 is to prevent the formation of a water insoluble soap film on the phosphate coating. The evidence of record stands uncontroverted that in the lubricant Bonderlube 235 the inclusion in the sodium soap of a small amount of borax, approximately 3% of the soap, results in controlling the pH, i.e., the acidity and

alkalinity, of the aqueous soap solution with which the zinc phosphate coated article is treated and in forming water insoluble soap (zinc stearate) as an integral part of the phosphate coating (R. 705-711, 731, 739-741, 790-794, 800-802). This is a result and effect of the use of borax as the solid inorganic compound in the process broadly described in claim 4 of the patent in suit which is directly contrary to the patentee Henricks' own statement of his alleged invention. It is neither disclosed nor suggested in the patent in suit (R. 469, 483-491); Henricks Deposition, p. 49). This demonstrates the indefiniteness of claim 4, in which the amounts and proportions of the compounds (solid meltable organic binding material containing distributed therethrough a solid inorganic compound) are left wholly indefinite and indeterminable, and further demonstrates that the claim is broader than the invention the patentee made or conceived.

[444] Conclusions of Law.

1. Claim 4 of the patent in suit Re. 24,017 is invalid:

(a) On the ground of lack of lawfully patentable invention in view of the prior art known and practiced at and before the time the alleged invention of claim 4 was made;

(b) On the ground that the process of claim 4 was known to and used by others before the applicant for the patent in suit claims to have made the discovery or invention thereof;

(c) On the ground that the patentee did not invent the subject matter purported to be described in claim 4 but merely adopted a process which, in view of the prior art and practice known in 1943, was obvious and known to persons familiar with and skilled in the art of drawing metal;

(d) On the ground that claim 4 defines merely an aggregation of process steps that were separately old and well known and that when combined produce no new, unexpected or unobvious result.

(e) On the ground that claim 4 fails to meet the requirements of the Patent Act, 35 U.S.C. Section 112, in failing to particularly point out and distinctly claim subject matter which the patentee regards as his invention, or subject matter for which the patentee is lawfully entitled to Letters Patent.

2. That the complaints filed herein be dismissed for want of cause for action.

/s/ Edwin A. Robson,
United States District Judge.

Date June 29, 1962.

[448] IN THE UNITED STATES DISTRICT COURT.
(Captions — 56-C-1912 — 57-C-892)

* * *

FINAL JUDGMENT

The above-entitled actions having been consolidated for trial by order of this Court entered November 19, 1959 upon the common issue of the validity of Claim 4 of United States Letters Patent Reissue No. 24,017, dated June 7, 1955, and having come on for trial upon the merits of said common issue, and this Court having duly considered the evidence presented at the trial and the briefs filed by the parties by their respective attorneys and having rendered and filed its Decision On Merits On Validity Of Claim 4 of Reissue No. 24,017 on February 1, 1962, and this Court having considered the Findings of Fact 1 to 29 and [449] Conclusions of Law 1 and 2 inclusive, and Revised Findings of Fact 3 and 7 submitted by defendant, General Motors Corporation, and adopted by defendants, Metal Lubricants Co. and Houdaille Industries, Inc., and the defendant, Metal Lubricants Co., having submitted three additional Findings of Fact and an addi-

tional Conclusion of Law, and plaintiffs having submitted their objections to Findings of Fact 5d, 6c, 11, 14, 16, 18, 20, 21, 22, 24, 26, 28 and 29 submitted by defendants and to the additional Findings of Fact and Conclusion of Law submitted by Metal Lubricants Co.,

It Is Hereby Ordered, Adjudged and Decreed:

1. That plaintiffs' objections to Findings of Fact 5d, 6c, 11, 14, 16, 18, 20, 21, 22, 24, 26, 28 and 29 last submitted by defendant, General Motors Corporation, are disallowed and said Findings of Fact and Conclusions of Law, including revised Findings of Fact 3 and 7, last submitted by defendant, General Motors Corporation, and adopted by defendants Metal Lubricants Co., and Houdaille Industries, Inc., are adopted and entered herein as those of this Court.

2. That the objections of plaintiffs to the additional Finding of Fact 31 and Conclusion of Law 3 tendered by defendant, Metal Lubricants Co., are sustained, and said Finding of Fact 31 and Conclusion of Law 3 are disallowed, and said additional Findings of Fact 29 and 30 submitted by defendant, Metal Lubricants Co., are hereby adopted and entered as those of this Court.

[450] 3. That Claim 4 of said United States Letters Patent Reissue No. 24,017, dated June 7, 1955, is invalid and void.

4. That the complaint herein in Civil Action No. 56 C 1912 and the complaint herein in Civil Action No. 57 C 892 each be and the same hereby is dismissed upon the merits and with prejudice to the plaintiffs in each of said actions.

5. That each of the defendants in each of said actions recover its costs to be taxed and that execution be had therefor.

/s/ Edwin A. Robson,
United States District Judge.

June 29, 1962.

IN THE UNITED STATES COURT OF APPEALS

For the Seventh Circuit.

No. 13979 September Term 1962—April Session 1963

Devex Corporation *et al.*, *Plaintiffs-Appellants*, v. General Motors Corporation *et al.*, *Defendants-Appellees.* } Appeal from the United States District Court for the Northern District of Illinois, Eastern Division.

July 12, 1963

Before Duffy and Swygert, *Circuit Judges*, and Major, *Senior Circuit Judge*.

Duffy, *Circuit Judge*. These are two civil suits for infringement of Henricks' Reissue Patent No. 24,017 which were consolidated for trial on the common issue of validity. Claim 4 is the only claim at issue.[1] The District Court held Claim 4 of the patent in suit to be invalid in view of the indefiniteness of the claim, the prior art and prior public use.

1. Claim 4 reads:

"4. The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal."

The patent in suit relates to lubrication of metal surfaces in cold drawing and deforming operations in shaping steel to desired forms by dies, to reduce friction between the steel workpiece being drawn or shaped and the die, to avoid scoring and tearing of the metal being drawn and to avoid injury to the surface of the dies.

1a The patent in suit is the outcome of an application, Serial No. 665,905, filed April 29, 1946 by the patentee Henricks, which was abandoned in favor of a continuation-in-part application filed October 31, 1950, upon which was issued United States Patent No. 2,588,234, dated March 4, 1952, for which application for reissue was filed March 1, 1954, upon which Re. Patent No. 24,017 now in suit issued on June 7, 1955.

Claim 4, the only claim in issue, is identical to Claim 45 as allowed by the Patent Office in the 1946 application. April 29, 1946, the date when the 1946 application was filed, is therefore the record date of invention to which the patentee is entitled.

The patent in suit relates particularly to the lubrication of metal for drawing and forming operations. It concerns cold forming operations as opposed to hot forming operations. When metal is drawn or deformed, to transform a blank or workpiece into another desired shape, there is necessarily some movement between the surface of the blank and the surface of the die, and an accompanying generation of high pressures and temperatures. Adequate lubrication is essential. Unless suitable provision for lubricating the surfaces is made, tearing of the metal or galling of the dies results. The problem is most acute where difficult draws of ferrous metals are involved. Drawing operations require costly tools and dies. It follows that wear and abrasion are very important considerations in tool and die work.

Among the suggestions contained in the patent in suit

is that of providing upon the surface of the work to be drawn, an integral phosphate coating and applying thereto a film of sodium tallow soap having borax distributed therein. It is contended that a solid meltable organic binding material mentioned in Claim 4 includes sodium tallow soap and that a solid inorganic compound mentioned in the claim includes borax.

Mohs' hardness scale is a known standard for indicating the relative hardness of materials. It is used in Claim 4 as a specification that the "solid inorganic compound" of the claim should not be hard enough to scratch the steel being drawn.

The prior art disclosed a number of lubricating schemes. These included the use of ordinary lubricating oils or lubricants containing finely divided infusible pigments such as clay, lime, mica or graphite. Most of such schemes were classified as "wet-film" lubricants which were wet and oily to the touch.

Later followed what is known as Singer's process, evolved in Germany and described in Singer United States Patent No. 2,105,015. Singer's scheme was to form a sponge-like coating, such as a phosphate, on the surface of the workpiece. The coating was not wet or flowable but was integral with the workpiece and could not be squeezed out in the drawing operation.

Phosphate coatings had been in use as early as 1914. These coatings had no lubricating value per se. They were, in fact, abrasive and caused tool and die wear even through superposed lubricants. The reason they were used in lubricating schemes was due to their ability to absorb and carry lubricant into a high pressure zone.

The next step forward in the art after the Singer process, was the development of the Gilron "Dry-Film" soap and borax lubricant. In this process, soap and borax were mixed with water and applied as an aqueous solution to

the surface of the workpiece. The soap and borax coating was then dried by heat lamps or the like onto the surface of the workpiece. As drawn, it was a hard fixed film and stayed with the workpiece in the high pressure zones. No other lubricant was used.

The Gilron soap-borax coating on bare metal being transparent, permitted inspection of the workpiece and eliminated the abrasive phosphate. The Gilron process supplanted the Singer process in the shell case program of the United States Government during World War II.

In 1942 and thereafter until 1945, Henricks, the patentee of the patent in suit, was employed by Gilron Products Company and was familiar with the uses of soap-borax lubricants described in patents No. 2,469,473 and 2,530,837. The Gilron lubricating product for use in drawing steel was sold under the tradename "Drawcote" and was composed principally of sodium soap formed from tallow and palm oil, and of borax in proportion by weight of 10-33% soap to 67-90% borax.

Drawcote was sold in the form of a dry powder. Gilron Products Company obtained patents on Drawcote and its use. United States Patents No. 2,469,473 dated May 10, 1949, and No. 2,530,837 dated November 29, 1950, were
3 obtained upon the joint application of Gilbert H. Orozco, a partner of Gilron Products Company and his employee Henricks, the patentee of the patent in suit.

Drawcote was extensively sold and used in 1942 and 1943 in cold drawing of steel cartridge cases. In those years during World War II, there was a shortage of copper for making brass shell cases for the ammunition used in military and small arms weapons. The Government required manufacturers of shell cases to make them from steel by cold drawing and deforming. This manufacture of steel shell cases occurred largely during the period 1942-1944, after which copper again became available.

In the manufacture of shell cases, Gilron's Drawcote was able to replace the use of other lubricants such as lubricated copper coatings for steel and lubricated phosphate coating for steel.

In 1943, among those using a lubricated phosphate coating on steel in the operation of cold drawing steel 75 mm. shell cases, was Briggs Manufacturing Company, Detroit. That Company was then providing zinc phosphate coatings on steel blanks and applying thereover a sulphurized grease as a lubricant. About June 1943, Whitbeck of Gilron Products Company sold Drawcote to Briggs. By experimentation, Briggs found it could successfully carry out its cold drawing operation with the Drawcote soap-borax lubricant applied directly to the surface of the steel without the phosphate coating.

Plaintiffs admit the Gilron borax coating solved many drawing problems existing at that time and that even today, it is satisfactory for many draws. However, plaintiffs claim the process has its limitations and cannot do what the Henricks process does.

The Patent Office was fully advised of the nature and advantages of the Gilron process. Patent No. 2,469,473 was a file wrapper reference.

Several references are made in the briefs to the "German Process." This was developed prior to 1942. In this process, a phosphated workpiece is soaked as long as fifteen hours in an aqueous soap solution to form thereon by chemical interaction between the phosphate and soap, a water-insoluble soap film. A serious defect in this scheme was that the residual deposit was not water soluble and presented a difficult cleaning problem especially if the workpiece was to be electroplated.

4 Plaintiffs concede all of the elements which Henricks employed in Claim 4 in the patent in suit were old per se or in other combinations and have been available in

the art for some years. However, plaintiffs contend that the elements which Henricks selected were put together in a new way and achieved a new and unexpected result.

Plaintiffs claim that in the specific embodiment of Claim 4, the "phosphate coating" is the abrasive coating of the Singer process—a seeming retrogression in the art. The overlying film is a fixed one and the "solid meltable organic" constituent thereof is soap, the use of which had previously been found undesirable because of the cleaning problem. The "solid meltable inorganic compound" distributed therethrough, meltable at a temperature below the melting point of the abrasive phosphate coating and having a hardness not more than 5 on the Mohs' scale, is borax.

Plaintiffs argue that new and unexpected results flow from the conjunction of elements defined in the drawing process of the Henricks' patent; that tool and die life is greatly increased and severe drawing operations can now be performed which were previously impossible. Plaintiffs say there is a coaction during the high temperatures and pressures whereby the abrasive phosphate coating reacts with the borax to form amorphous glassy materials which contribute significantly to the lubricating value of the coating; that the formation of insoluble organic materials is inhibited and there is no cleaning problem.

There is substantial evidence in the record to prove that a new coaction between the soap, borax and phosphate occurred during the drawing process. Friedberg's tests showed that in the Henricks' process, new compounds are formed; the formation of insoluble organic compounds is inhibited, and the abrasive phosphate is transformed into a glassy amorphous compound having highly effective lubricating properties.

There was also proof based upon commercial use and experience. Metal Forming & Coining Corporation tried a number of the prior art schemes including oils, waxes

and drawing compounds, but the testimony showed that the only process that enabled this Company to cold form or coin small parts commercially is the combination in the Henricks' patent in suit. Testimony showed tool and die life was increased one thousand fold so that for given tools, three or four hundred thousand pieces were run where previously only three or four hundred pieces could be run. The Henricks' process made it possible to manufacture articles of superior quality at a much lower cost, the advantage being so marked in some cases as to spell the difference between success and failure on heavy reductions and difficult extrusions.

Defendants have engendered a great interest in an endeavor to have the Henricks' patent in suit declared invalid. The defense of this action has been conducted primarily by the attorneys for the Parker Rust Proof Company of Detroit. Parker supplies phosphate and lubricating materials to defendant General Motors, and is holding General Motors harmless. Parker solicited financial and legal help in this lawsuit from a number of its own competitors, and at least three of these competitors in manufacturing and selling phosphate and lubricating material, have given assistance in this case. Of course, these competitors had the right to give such assistance. However, such interest does indicate that the process covered in Claim 4 of the patent in suit is something of special value and merit and of great importance to those working in the field of cold drawing and deforming operations.

The trial court held Claim 4 too broad and lacking in specificity. The court stated the claim did not specify the kind of phosphate coating, the kind of organic binding, the kind of solid inorganic compound, as well as not specifying the amounts and relative proportions of any such items.

Pertinent on this point is a recent case before this Court, *Binks Manufacturing Company* v. *Ransburg Electro-Coat-*

ing Corporation, 281 F. 2d 252. In that case, the claim was made that the method claims of the patent there in suit did not satisfy the requirements of the patent statute (35 U. S. C. § 112) due to failure to specify voltage, spacing and liquids to which they are applicable. In overruling this argument we said at page 256: "The process claims define the specific steps of procedure and the specifications being addressed to those skilled in the art . . . need not recite details." We further stated at page 257: "There is no requirement that quantitative values for such factors as voltage, spacing and liquid characteristics be recited. The fact that experimentation or the exercise of judgment is necessary to adapt a patented process to particular material or to obtain the particular results desired does not impair validity of the patent."

The fact that Claim 4 distinguishes from thirty-one references in a mature art, none of which anticipate, quite clearly establishes that the claim is not too broad and indefinite.

Patent claims should be generic in character and do not necessarily have to be specific. It is entirely proper to refer in Claim 4 to "a phosphate coating" without specifying which "phosphate coating."

The examples stated in the patent in suit and the specification teach the use of soap and borax over phosphate. They give formulas for the soap and borax and they identify the phosphate coating baths so that one skilled in the art could make them. The trial court was in error in holding that Claim 4 in the patent in suit was too broad and lacking in specificity.

It is fundamental that a patent is presumed to be valid and the burden of establishing invalidity rests on the party asserting it (35 U.S.C. § 282). It is well established the presumption of validity is not overcome except by clear and cogent evidence. *Radio Corporation of America* v. *Radio Engineering Laboratories, Inc.*, 293 U. S. 1, 7; *Hazel-*

tine Research, Inc. v. *Dage Electric Company, Inc.*, 7 Cir., 271 F. 2d 218, 224.

Defendants claim the Patent Office did not consider Singer Patent No. 2,105,015 nor British Patent No. 494,830 of 1938, and also several publications. However, the Singer process is described in British Patent No. 496,866 which was relied upon by the Patent Office during prosecution of the patent. Soap and borax dry-film lubricants are described in Patents No. 2,469,473 and 2,470,062. The former was relied upon as a reference in the Patent Office and the latter is referred to in the body of the specification of the Henricks' patent in suit.

The Patent Examiner had before him as prior art, all of the elements of Henricks' combination and found patentable invention in the combining of these elements. In fact, the Patent Office twice found invention over the prior art, first, when the original patent was granted, and second, when the reissue patent was granted. There is no showing in this case that the most pertinent prior art was not considered by the Patent Office. On the contrary, we think the most pertinent art was cited and was found insufficient to negative patentability.

We cannot sustain the conclusion of law of the trial court that Henricks merely adopted the process which, in view of the prior art, was obvious to persons skilled in the art. The history of Parker Rust Proof Company demonstrates the process was not obvious. Parker Rust Proof has been a self-proclaimed leader in this field since 1914, but Parker remained uncertain as to how the problem should be solved until some considerable time after the Henricks' invention date.

Dr. Gibson was Technical Director for Parker in 1949 when they decided to develop a lubrication system. Dr. Gibson is now a professor of chemistry and qualified as one "skilled in the art." Parker, in 1949, was operating in

the light of the prior art. Dr. Gibson was in charge of this development. They started in "basically with a literature search." They then worked with wet-film lubricants because, as Dr. Gibson testified, "We hadn't realized the true value of drying that particular film." Parker experimented with the formation of an organic film with phosphate as mentioned in the German references. Finally, Parker came to the Henricks' combination which it extolled in its literature as a new development of Parker.

The literature references which Parker now points to as teaching the invention, taught Parker nothing. Neither did the practices at Briggs Manufacturing Company. The substitution of soap and borax dry-film for the wet lubricant in the Singer process was, in fact, not obvious to Parker.

The Henricks' process was not, in fact, obvious to the defendants and the others now associated with them in the defense of this suit. None of them made the substitution of elements in the Singer process which, by hindsight, now appears to them to have been "obvious."

Although the learned trial judge found Claim 4 of the patent in suit to be invalid on all suggested grounds, we are of the view that the closest question in the case is the finding and conclusion of the trial court as to public use. This, in turn, refers to use at Briggs Manufacturing Company in 1943. All of the evidence on this point, except patentee's own evidence, is contained in depositions. It is apparent from Finding 14 that the Court relied upon the testimony of Tousley and Brown which appeared in depositions.

As the evidence relied on appears in depositions, we are in as good a position as the trial court to examine it and determine for ourselves whether the use at Briggs Manufacturing Company was a public use. *Kiwi Coders Corporation* v. *Acro Tool & Die Works*, 7 Cir., 250 F. 2d

562, 568; *Lewyt Corporation* v. *Health-Mor, Inc.*, 7 Cir., 181 F. 2d 855, 857.

The trial court did not hold the combination claimed in the patent in suit was publicly used in its entirety or that the valuable new result flowing from the combination was understood or achieved at Briggs. What the trial court decided was: "While it is arguable that the precise combination and coaction indicated by the patent are not found verbatim in the prior art, one armed with the knowledge of a worker skilled in that field could, the Court believes, have achieved the result covered by Claim 4 of the reissue patent." The trial court further recognized that the patentee in the patent in suit did make a stride forward in the art but apparently thought it was not sufficient to merit a patent monopoly.

There exists a well established rule that to invalidate a patent on the ground of public use, the prior public use must be established by clear and convincing proof.

In *Smith* v. *Hall*, 301 U. S. 216, 233, the Court refers to the rule as ". . . the heavy burden of persuasion which rests upon one who seeks to negative novelty in a patent by showing prior use." In *Radio Corporation of America* v. *Radio Engineering Laboratories, Inc.*, 293 U. S. 1, 7, the Court cites with approval a number of cases for the proposition, the burden of proof is upon the party setting it up and "every reasonable doubt should be resolved against him." Indeed, the late Chief Judge Learned Hand stated the rule in even more emphatic language in *Block* v. *Nathan Anklet Support Co., Inc.*, 2 Cir., 9 F. 2d 311, 313, ". . . but in such cases probability, even extreme probability, is not enough. The proof must be as absolute as in a criminal conviction; indeed, the rule comes nearly to this, that one must have contemporaneous records, verbal or structural."

In June 1943, when Henricks came to the Briggs Manufacturing Company in behalf of the Gilron Products Draw-

cote, a number of experiments were conducted which led
9 to the changeover from the Singer process to Gilron.

Each blank tested was subjected to six consecutive forming operations. Henricks experimentally ran two baskets of blanks with a phosphate undercoat. There were approximately one hundred test pieces in the two baskets, a very small amount considering the large volume being handled. No further notice was taken of the pieces themselves, and they were enveloped in the big flow of material that was in process. The success of the process was in no way there demonstrated. This rather minor incident at Briggs did not lead to the use of the patented combination by Briggs. In fact, Briggs abandoned the use of phosphate entirely. The temporary and almost casual experiment with soap and borax went into the discard.

After the decision in this case by the trial court, Henricks received information that the United States Government Arsenal at Joliet, might have a report which would show the true facts as to the Briggs operation. Inquiry there revealed nothing. The inquiry was forwarded to Frankfort Arsenal. Nothing was found there, but when the inquiry was forwarded to the Record Files in Missouri, a report was located. Henricks was permitted to read the report and make extracts therefrom.

Plaintiffs filed a motion to amend the findings of fact and for a new trial. The Court denied the motion. This was understandable where the Court considered the patent to be invalid on all grounds urged. However, as our view is that the turning point of this case is the question of alleged public use at Briggs, we think the report should have been considered, especially that part which deals with the initial experimentation with the Gilron process. It would appear reasonable that if there had been any significant or more than experimental use of soap and borax over phosphate in cartridge-case manufacture at Briggs,

it would surely have appeared in the report which the Briggs officials made to the army ordnance.

Another convincing argument in favor of plaintiffs' contention is that if soap and borax had been applied over phosphate in regular production, there would necessarily have been a tank for phosphate solution and a separate tank for the soap and borax solution arranged in series so that the baskets containing the blanks or workpieces would move successively through the two solutions. There is no claim that any such procedure was followed.

We hold there is no sufficient showing of prior public use and that Claim 4 of the patent in suit is valid. The case will, therefore, be remanded to the District Court for further proceedings consistent with this opinion, as the question of validity only was passed upon in the previous trial.

Reversed.

[11] UNITED STATES OF AMERICA, ss.

The President of the United States of America.

(Seal)

To the Honorable the Judges of the United States District Court for the Northern District of Illinois, Eastern Division, Greeting:

Whereas, lately in the United States District Court for the Northern District of Illinois, Eastern Division before you, or some of you, in a cause between Devex Corporation, et al., Plaintiffs, and General Motors Corporation, et al., Defendants, District Court Nos. 56-C-1912 and 57-C-892, a judgment was entered on the twenty-ninth [12] day of June, 1962, as by the inspection of the transcript of the record of the said District Court, which was brought into the United States Court of Appeals for the Seventh Circuit by virtue of an appeal by Devex Corporation, et al. agreeably to the act of Congress, in such case made and provided, fully and at large appears.

[13] And Whereas, in the term of September, in the year of our Lord one thousand nine hundred and sixty-two, the said cause came on to be heard before the said United States Court of Appeals for the Seventh Circuit, on the said transcript of record, and was argued by counsel.

On Consideration Whereof, it is ordered and adjudged by this Court that the judgment of the said District Court in this cause appealed from be, and the same is hereby, Reversed, with costs, and that this cause be, and it is hereby Remanded to the said District Court for further proceedings consistent with the opinion of this Court filed this day, as the question of validity only was passed upon in the previous trial.

Friday, July 12, 1963.

And afterwards, to-wit, on the twenty-sixth day of July, 1963, there was filed in the office of the Clerk of this Court a petition for rehearing, which said petition for rehearing was denied on the fourth day of September, 1963, and further that Plaintiffs-Appellants, Devex Corporation, et al. recover against the Defendants-Appellees, General Motors Corporation, et al. the sum of one thousand, six hundred fifteen and sixty-eight/100ths Dollars ($1,640.68) for docketing and printing costs herein expended with direction to award execution thereof.

[14] You therefore are hereby commanded that such further proceedings be had in said cause, as according to right and justice and the laws of the United States, aught to be had, the said judgment notwithstanding.

Witness, the Honorable Earl Warren, Chief Justice, of the United States, the sixteenth day of January, in the year of our Lord one thousand nine hundred and sixty-four.

Kenneth J. Carrick,

(Seal) *Clerk of the United States Court of Appeals for the Seventh Circuit*

By: Thomas F. Hauble,

Deputy Clerk.

Endorsed: United States Court of Appeals for the Seventh Circuit,

No. 13979. September Term, 1962. Devex Corporation, et al. vs. General Motors Corporation, et al. Mandate.

OFFICE OF THE CLERK
SUPREME COURT OF THE UNITED STATES
WASHINGTON, D.C. 20543

January 6, 1964

RE: GENERAL MOTORS CORPORATION, ET AL.
v. DEVEX CORPORATION, FT AL., No. 618,
OCT. TERM, 1963

Dear Sir:

The Court today denied the petition for writ of certiorari in the above-entitled case.

Very truly yours,

JOHN F. DAVIS, Clerk
By

Assistant

George N. Hibben, Esq.
Hibben, Noyes and Bicknell
332 South Michigan Avenue
Chicago, Illinois

DISTRICT COURT, N.D. ILLINOIS, E. DIV.
DEVEX CORPORATION ET AL. V. HOUDAILLE INDUSTRIES, INC.

57C892 **Decided Dec. 15, 1965**

Robson, District Judge (orally)

This cause is before the Court on remand for the determination of the issue of infringement by defendant, Houdaille Industries, Inc., of claim 4 of Henricks' reissue patent No. 24,017. Counter-motions for summary judgment have been filed.

Plaintiffs have renewed their motion for summary judgment on the issue of infringement, and Houdaille has filed a motion for summary judgment.

As plaintiffs point out, the Court on the denial of [367] their original motion for summary judgment on March 10, 1965, indicated a willingness to reconsider its denial, after the taking of additional discovery.

Since that time plaintiffs have taken the deposition of Leslie C. Borchert, and the deposition of patentee Henricks has also been taken. The Court has carefully examined both depositions. It finds that in the main they are directed to an undermining of the ruling upholding validity, and to refute the conclusion that there is no eradication or alleviation of the problem of cleaning the extruded bumper prior to plating.

The issue of infringement seems to turn on the breadth of the construction to be accorded claim 4. Defendant maintains that it is to be narrowly construed in that the Court of Appeals sustained the novelty and validity of the claim on the basis of the coaction of soap, borax, and phosphate, resulting in the formation of no insoluble zinc stearate. Since defendant's proof shows continued existence of zinc stearate, it does not infringe.

Plaintiffs assert that the claim should not be so [368] limitedly construed and that infringement exists although a negligible amount of zinc stearate still is formed. Plaintiffs maintain that the word "inhibits", as used by the Court of Appeals, does not mean complete elimination of zinc stearate, but only that the amount there is substantially decreased. The Court concludes that plaintiffs' position is the sound one.

Claim 4 reads:

> "The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal."

The critical words in the discussion of this claim by [369] the Court of Appeals are at page 237:

> "There is substantial evidence in the record to prove that a new coaction between the soap, borax and phosphate occurred during the drawing process. Friedberg's tests showed that in the Henricks' process, new compounds are formed; the formation of insoluble organic compounds is inhibited, and the abrasive phosphate is transformed into a glassy amorphous compound having highly effective lubricating properties."

Plaintiffs challenge defendant's interpretation of the word "inhibited" and contend it means, as the dictionary indicates, a decrease, repression or retardation, and not a complete elimination or obliteration of the water insoluble residue of zinc stearate.

Defendant believes that the Court of Appeals' holding of validity centered on the novelty residing in the complete elimination of the water insoluble zinc stearate residue, which rendered unnecessary the electrolytic bath of the metal bar before the application of a chrome finish. [370] Plaintiffs

negate the necessity for this Court's finding that defendant's process utilizes high temperatures and pressures so as to cause the formation of amorphous glassy materials. Claim 4 has no such element. It is simply an explanation in the Court of Appeals' description of the conditions under which the coaction obtains.

Defendant Houdaille's motion for summary judgment is predicated principally upon the contention that the co-action on which the Court of Appeals found inventiveness (a soap-borax fixed film over an integral phosphate coating) was not disclosed in the earlier but abandoned application of Henricks filed April 29, 1946, and did not appear until the application for the continuation-in-part filed October 31, 1950, which application matured into the original Henricks Patent No. 2,588,234, and later into the Reissue No. 24,017.

Defendant asserts it had used the process here charged to infringe as early as April 25, 1949, more than one year prior to the date of the application for the continuation-in-part (which process produced no such "new and unobvious results") and defendant therefore has "inter- [371] vening rights" (Muncie Gear Co. vs. Outboard Co., 315 U.S. 759).

Plaintiffs are therefore stopped, Houdaille asserts, from claiming infringement; or, defendant should be held not to infringe because it obtains no new and unexpected results, nor does it use the high pressures required by plaintiffs' process. Defendant would restrict plaintiffs to Henricks' October 31, 1950, filing date.

Defendant "submits that the infringement issue need not be tried since defendant's justification of its right to use the process complained of disposes completely of that issue." Further, it says it has practiced its process under conditions that do not result in the "new coaction" nor achieve any of the "new and unexpected" results attributed to such claimed process by the Court of Appeals.

The Court is of the opinion that on this remand it is not within its province to reassess the validity of the patent as it might be affected by the defense of prior public use, or to limit the claim's breadth of construction to processes wherein there is complete absence of zinc [372] stearate formation, rather than a substantial diminution thereof. The Court of Appeals found there was " . . . no sufficient showing of prior public use and that claim 4 of the patent in suit is valid."

The Court concludes that no genuine issue of fact remains as to Houdaille's infringement of claim 4. Plaintiffs have clearly demonstrated by the answers of defendant to the interrogatories that defendant's process responds to each element of the claim.

The defendant's attempt to avoid a finding of infringement by reading the claim restrictively to a scope where the process completely prevents the formation of zinc stearate is not warranted by the language of the Court of Appeals, or by the phraseology of the claim itself.

Plaintiffs dispute defendant's contentions in respect to the existence of non-infringement because the defendant's practice of the process does not result in the benefit found by the Court of Appeals to warrant a finding of validity. Plaintiffs point out that an imperfect infringement nevertheless constitutes an infringement. (Ekco Products [373] Co. *vs.* Chicago Metallic Manufacturing Co., 321 F. 2d 550; Colgate-Palmolive-Peet Co. *vs.* Lever Bros. Co., 90 F. 2d 178, 194, both Seventh Circuit Court of Appeals opinions.) That court in the Ekco Products Co. case, supra, said, at page 555:

> "Imperfect practice of the patented process does not avoid infringement."

The Court of Appeals found that the patent taught the use of soap and borax over phosphate (321 F. 2d 234, at 238). The brief of the plaintiffs points out several quotations from the

abandoned application supportive of the process claimed in claim 4 and asserted to be infringed. Further, defendant points out that the phrasing of claim 4 has remained the same from the beginning (with the exception of the word "solid" being substituted for the word "hardened") and that there was never a contention that the original abandoned application did not support that claim.

Plaintiffs' final brief stresses the finding of the Court of Appeals that patentee's record date of invention is [374] April 29, 1946, since claim 4 is identical to claim 45 allowed by the Patent Office (321 F. 2d 235) and defendant may not now assert the October 30, 1950 date.

Defendant counters that the abandoned 1946 application affords no adequate basis for construing application claim 45 to cover a fixed film of soap and borax over a phosphate coating, and in giving claim 4 this construction the Court of Appeals said nothing with regard to whether claim 45 would also support such construction. Further, defendant deems the quoted Court of Appeals statement to be obiter dictum because not based on any evidence or finding before this Court.

It is evident from Henricks' testimony on the deposition that he believes the examples given in the abandoned application are construable to cover claim 4 so as to justify his claim to the earlier date, precluding the public use defense of defendant. The examples given were "fully equivalent with soap and borax in the sense of the invention."

He said he had not gone into the "absoluteness" of [375] the prevention of zinc stearate but the cleaning operation is easier with a soap and borax combination than with straight soap. The formation of zinc stearate is greatly reduced, although there is some formation of it. The cleaning process would be "simplified," and cleanability is "enhanced".

Whether he had the Court of Appeals language and these motions for summary judgment in mind or not, he stated on his deposition that "in either event, whether soap or soap-borax is used, there is a residual coating containing some zinc stearate, but it is inhibited but not completely prevented."

Throughout the deposition Henricks states that much less insolubility remains when soap and borax are used rather than straight soap. With soap and borax there is less zinc stearate and better cleanability. He said one could not prepare for plating without an acid dip. He felt that Borchert was "maneuvered into a completely meaningless affidavit" in which three-quarters of his test samples were not prepared for plating. He said that no plater plates without acid. If plating is not done cleaning is unimportant.

[376] He said, "I have never tried to indicate that there was any magic by which we fully inhibit, 100 per cent inhibit, the formation of zinc stearate." "Where you go to high pressure on bumpers you need soap with borax, and need the phosphate to reinforce the borax. The absence of borax has caused trouble in the industry of cold extrusion because soap alone will not draw." He states in his original application he had a drawing example of a phosphate covered with a soluble stearate and a borate combination dried on and he also had references to borax as a pigment and soap as a binder in the original.

He said the cleaning was improved as he pointed out in the original application because of the borax emulsification.

The language of Beach vs. Inman et ao., 75 F. 840, affirmed 78 F. 923, seems here appropriate:

> "When a patentee has obtained a final decree after years of arduous litigation, it should be final in reality as well as in name. It should guard his rights against all intruders; it should be a document of the

> utmost [377] value, and not a mere brutum fulmen. If, after having passed the ordeal of the courts, patents are still to be scanned with a hostile microscope, and the inartistic and, perhaps, thoughtless nomenclature of the description is to be substituted for the machine itself, an invitation is extended to infringers to begin again the work of spoliation under a new disguise. . . . When the actual invention is made clear, the inventor should not be impaled upon a sharp construction of his ill-chosen adjectives. An infringer should not escape because he is able to 'evade the wording of the claims.' "

In determining the instant issue the statement in Midland Steel Products Co. *vs.* Clark Equipment Co., 174 F. 2d 541, is pertinent. There at page 545, it was said:

> " . . . an element cannot be read into a claim in order to make out a case of noninfringement . . ."

Defendant's attempt to read into the claim a requirement that there be complete elimination of the formation of [378] zinc stearate is not warranted by the wording of claim 4. This is not an instance of expanding "by the doctrine of equivalents to embrace particulars excluded by the prosecutional history of the patent." (Jacwil Mfrs. *vs.* Batesville Casket Company, 311 F. 2d 38.

As plaintiffs point out, there can be little question that defendant's practice responds to Claim 4, so as to constitute infringement thereof. The first phrase, "The process of working ferrous metal", is covered by the interrogatory answers that defendant makes automobile bumpers at its Chicago and Huntington, West Virginia divisions.

The next phrase, "which comprises forming on the surface of the metal a phosphate coating", is also covered by an

answer to an interrogatory which states, "the bumper stock is immersed in or sprayed with a phosphate coating bath prior to the drawing operation so as to form thereon a phosphate coating".

This fact is also stated in the Borchert deposition at page 39. The next phrase of claim 4, "and superim- [379] posing thereon a fixed film of a composition comprising a solid meltable organic binding material", is covered by the Borchert deposition, page 39, and answers to interrogatories 3 and 4.

The next phrase of claim 4, "containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale", is covered by answers to interrogatories 5 and 12, and the Borchert deposition pages 39-40. The final phrase, "and thereafter deforming the metal", is covered by the answer to interrogatory 1.

The Court therefore concludes that the plaintiffs' renewed motion for summary judgment should be granted and defendant's motion for summary judgment denied; that there should be a finding of infringement by the defendant of claim 4 of the Reissue Patent No. 24,017, upon the basis of defendant's answers to the interrogatories and the depositions heretofore filed.

In view of the Court's conclusion in respect to the [380] motions for summary judgment it follows that defendant's motion for production of documents is also denied.

That will be the order of the Court.

DEVEX CORPORATION et al., Plaintiffs-Appellees,
v.
HOUDAILLE INDUSTRIES, INC., Defendant-Appellant.
No. 15732

United States Court of Appeals
Seventh Circuit.
July 12, 1967.

Before MAJOR, Senior Circuit Judge, and SWYGERT and CUMMINGS, Circuit Judges.

MAJOR, Senior Circuit Judge.

This appeal is a continuation of litigation of long duration. On November 13, 1956, plaintiffs filed their complaint against General Motors and Metal Lubricants Company for infringement of Henricks Patent Re. 24,017, dated June 7, 1955. On May 22, 1957, plaintiffs filed a companion case against the instant defendant (Houdaille Industries, Inc.), for infringement of the same patent. In both cases plaintiffs relied solely upon Claim 4. The cases were consolidated on the common issue of validity, and Judge Robson held the Henricks patent invalid. On appeal, this Court reversed, held the claim valid and remanded the case for further proceedings consistent with the opinion. Devex Corp. et al. v. General Motors Corp. et al., 7 Cir., 321 F.2d 234, cert. den. 375 U.S. 971, 84 S.Ct. 490, 11 L.Ed. 2d 418. Upon remand, the case against Metal Lubricants Company was dismissed by consent and that against General Motors, on motion by plaintiffs, was transferred to the District of Delaware.

In the instant case plaintiffs moved for a summary judgment that defendant had infringed Claim 4 of the Henricks patent, which was first denied. After further deposi-

tion testimony was taken, plaintiffs renewed their motion and on February 17, 1966, it was allowed. The case is here on defendant's appeal from this judgment.

On June 23, 1965, prior to plaintiffs' renewed motion for summary judgment, defendant, with leave of the Court, filed an amended answer setting up additional defenses, including (a) license, (b) laches, (c) prior public use by defendant, (d) shop right, (e) patent misuse, (f) intervening rights, (g) lack of continuity between the original patent and the preceding abandoned application and (h) release. The amended answer allegedly was based upon facts ascertained from the May 17, 1965 deposition of Henricks. In connection with its amended answer defendant moved for the production of documents, which was denied.

The Court in its summary judgment decreed infringement of Claim 4, enjoined defendant from further infringement and referred the case to a Special Master to hear and submit to the Court findings on the issue of damages. The judgment also provided for a determination by the Master of the affirmative defenses invoked by defendant. On March 3, 1966, defendant's motion to vacate the summary judgment was denied.

The companion case of General Motors, transferred to the Delaware District as previously shown, was heard by Judge Caleb M. Wright on plaintiffs' motion for summary judgment. In a well reasoned opinion the Court concluded that summary judgment was inappropriate and denied such relief. Devex Corp. et al. v. General Motors Corp., 263 F.Supp. 17. Concerning the Delaware case, defendant on brief states, "So far as infringement is concerned, the issues there are substantially identical with those involved here." Plaintiffs take no issue with this statement, in fact do not even mention the case although it was decided more than two months prior to the date on which plaintiffs' brief was filed in this Court, with the same counsel representing plaintiffs in both cases.

In the interest of brevity, we refer to our previous opinion written by Judge Duffy, for a history of plaintiffs' patent, its purpose and scope, the claim relied upon and the reasoning on which validity was sustained.

At the inception we are met with plaintiffs' challenge that the order under attack is not appealable and should be dismissed. Defendant responds that we have jurisdiction under Par. (a) (1) or (4) of Sec. 1292, Title 28 U.S.C.A. The former provides jurisdiction of an appeal from an order granting an injunction, the latter from judgments for patent infringement which are final except for accounting. Plaintiffs cite a number of cases in support of the point that "an appeal from an interlocutory order granting an injunction brings up for review nothing but the propriety of granting the injunction," and such appeal "does not bring up for review those parts of the decree which affect only the reference to a Master and bear no necessary relation to the merits of the injunction."

In Loew's Drive-In Theatres, Inc. v. Park-In Theatres, Inc., 1 Cir., 174 F.2d 547, 550, the Court stated:

> "Our jurisdiction over this cause of action on appeal, however, is another matter. For although injunctive relief is granted in the judgment appealed from and we have appellate jurisdiction over such judgments under 28 U.S.C.A. Sec. 1292 (1) even though interlocutory, we have jurisdiction to review only that part of such judgments as have to do with the injunctive relief afforded and no other."

In Racine Engine & Machinery Co. v. Confectioners' Machinery & Mfg. Co., 7 Cir., 234 F. 876, 878, speaking to the same point, this Court stated:

> "* * * if and after the patent is sustained, infringement found and injunction awarded, upon appeal

this court may finally determine the validity of the patent, and its determination is binding on the District Court."

[1-3] These and other cases cited by plaintiffs recognize that a court with jurisdiction to hear an appeal from an injunction order must necessarily have jurisdiction to consider the propriety of the premise upon which the injunction issued. As applied to the instant case, our authority to consider the propriety of the injunction carries with it the authority to consider the infringement issue upon which the injunction issued. It may be that we are without authority to consider the affirmative defenses interposed by defendant prior to the entry of the summary judgment and referred to the Master for decision. We need not be concerned in this regard, however, because, assuming we have such authority, we would not be disposed to exercise it in the absence of a ruling by the court below on such issues. We hold that we have jurisdiction of the appeal from the injunction order and of the infringement issue upon which it is predicated.

[4] Plaintiffs also contend that defendant has no standing to complain of the order enjoining it from further infringement, on the basis that it consented to and openly invited its entry, thereby waiving any right to complain of error. We see no reason to cite or discuss the cases cited in support of this contention. They are without application to the facts of the case.

In this connection plaintiffs place much emphasis on the assertion that the judgment order was proposed by defendant. True, it was so labeled, but there clearly emerges, on a confusing record, the fact that defendant did not consent to or invite the order, particularly that part which enjoined it from further infringement. Plaintiffs attached to their original and again to their renewed motion for summary judgment a form of proposed judgment. The Court in an oral decision granted

plaintiffs' renewed motion and, at the Court's suggestion, plaintiffs submitted a revised form of judgment. On February 16, 1966, defendant served on plaintiffs a "Notice of Motion," notifying them that defendant "*without waiving any rights* will present the attached draft of a judgment order." The February 17 order alleged to have been proposed by defendant was presented to the Court, "approved as to form."[1]

Defendant in no way consented to the injunction or waived its opposition thereto; its activities were confined to limitations on the forms of judgments submitted by plaintiffs. Moreover, defendant subsequently attacked the entire judgment order by its motion to vacate, which was denied March 3, 1966. Plaintiff's argument on this phase of the case is entirely without merit.

[5] Preliminary to any discussion of the narrow issue for decision, we must keep in mind that it is not within our province to make a determination on factual issues. The sole question is whether plaintiffs under Rule 56(c), Federal Rules of Civil Procedure, were entitled to a summary judgment and thereby precluded defendant of the right to a hearing. The citation of only a few of the many cases which have announced the criterion to be employed in resolving such question will suffice.

In Poller v. Columbia Broadcasting System, Inc., et al., 368 U.S. 464, 467, 82 S.Ct. 486, 488, 7 L.Ed.2d 458, the Court stated:

> "This rule authorizes summary judgment 'only where the moving party is entitled to judgment as a

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[1] Neither on brief nor in their appendix offered in support thereof do plaintiffs reveal that defendant's order was proposed "without waiving any rights" and was "approved as to form" only.

matter of law, where it is quite clear what the truth is, * * * [and where] no genuine issue remains for trial * * * [for] the purpose of the rule is not to cut litigants off from their right of trial by jury if they really have issues to try.'"

The Court further stated (page 473, 82 S.Ct. page 491):

"We look at the record on summary judgment in the light most favorable to Poller, the party opposing the motion, and conclude here that it should not have been granted."

In National Screen Service Corp. v. Poster Exchange, Inc., 5 Cir., 305 F.2d 647, 651, the Court stated:

"The rule should be invoked cautiously in order to allow a full trial where there is a bona fide dispute of facts between the parties. Summary judgment should be granted only where the moving party is entitled to judgment as a matter of law, ***where it is quite clear what the truth is***, when no genuine issue remains for trial, and it is not the purpose of the rule to deny to litigants a right of trial if they really have issues to try. [Citing cases.] It is no part of the duty of the Court to decide factual issues, but only to determine whether there are factual issues to be tried [Citing case.]

" * * * A long line of cases have held that summary judgment should not be granted if there is the 'slightest doubt' as to the facts; which is actually another way of stating that there is no genuine issue as to any material fact. The fact that it may be surmised that the party against whom the motion is made is unlikely to prevail at the trial is not sufficient to authorize summary judgment against him."

[6] Among other cases which have emphasized that caution is to be exercised in granting summary judgment are two of this Court. American Security Co. v. Hamilton Glass Co., Inc., 7 Cir., 254 F.2d 889, 892, and Technograph Printed Circuits, Ltd. v. Methode Electronics, Inc., 7 Cir., 356 F.2d 442, 446.

After much study of the voluminous record, we conclude that the Court erred in allowing plaintiffs' motion for summary judgment. We think defendant is entitled to a trial on the infringement issue, as well as any relevant issue raised by its amended answer. While Judge Robson in his opinion (not published) discusses the restrictions placed by this Court on Claim 4 as a basis for our holding of validity, it seems to us that he mistakenly based his conclusion on a literal reading of the claim. In his opinion he states, "As plaintiffs point out, there can be little question that defendant's practice responds to Claim 4, so as to constitute infringement thereof." Following this statement he analyzes the claim element by element, concludes that defendant's process responds to each of said elements and states, "The Court therefore concludes that the plaintiffs' renewed motion for summary judgment should be granted * * *; that there should be a finding of infringement by the defendant of Claim 4 of the Reissue Patent No. 24,017, upon the basis of defendant's answers to the interrogatories and the depositions heretofore filed."

Concerning the holding of Judge Robson, plaintiffs on brief state:

> "* * * he held that Houdaillle's attempts to avoid a finding of infringement by reading the claim restrictively was not warranted by the language of that opinion [321 F.2d 234], or by the language of the claim itself."

For reasons subsequently shown, we think this is a fallacious approach to the infringement issue. Our previous decision re-

quires that the claim in suit be given a narrow and restricted construction.

We need not give any consideraton to the prior art which Judge Robson in the first hearing considered and upon which he found Claim 4 invalid. In our previous decision (321 F.2d 234), reversing his holding of invalidity we stated (page 236):

> "Plaintiffs concede all of the elements which Henricks employed in Claim 4 in the patent in suit were old *per se* or in other combinations and have been available in the art for some years. However, plaintiffs contend that the elements which Henricks selected were put together in a new way and achieved a new and unexpected result."

Thus, it was conceded that all of the elements of the claim were old in the art, but plaintiffs sought to uphold validity upon the basis that such elements "were put together in a new way and achieved a new and unexpected result." It was solely on this basis that this Court sustained validity and reversed the District Court. In this connection we stated (page 237):

> "Plaintiffs argue that new and unexpected results flow from the conjunction of elements defined in the drawing process of the Henricks' patent; that tool and die life is greatly increased and severe drawing operations can now be performed which were previously impossible. Plaintiffs say there is a coaction during the high temperatures and pressures whereby the abrasive phosphate coating reacts with the borax to form amorphous glassy materials which contribute significantly to the lubricating value of the coating; that the formation of insoluble organic materials is inhibited and there is no cleaning problem.

> "There is substantial evidence in the record to prove that a new coaction between the soap, borax and phosphate occurred during the drawing process. Friedberg's tests showed that in the Henricks' process, new compounds are formed; the formation of insoluble organic compounds is inhibited, and the abrasive phosphate is transformed into a glassy amorphous compound having highly effective lubricating properties."

We further pointed out that there was testimony that by use of the process "tool and die life was increased one thousand fold" and that the process made it possible "to manufacture articles of superior quality at a much lower cost."

It is difficult to discern how plaintiffs can contend with any plausibility that defendant is an infringer, based upon a literal reading of the claim. In the previous case plaintiffs urged as a ground for sustaining validity a narrow and restricted application of the "specific embodiment of Claim 4." On brief they state:

> "Specifically, there is a coaction during the high temperatures and pressures of the drawing process whereby the abrasive phosphate coating reacts with the borax to form amorphous glassy materials which contribute significantly to the lubricating value of the coating. The formation of insoluble organic materials is inhibited and there is no cleaning problem."

They also relied on "new and surprising results" to meet the test of Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp., 340 U.S. 147, 71 S.Ct. 127, 95 L.Ed. 162. Thus, having obtained a decision of validity on a narrow and restricted basis, they now contend, inconsistently we think, that the claim must be applied literally to defendant's alleged infringing process. Such a construction would monopolize the

whole broad field of metal forming with any use of a dry soap and borax over phosphate at any temperature or pressure, regardless of the results.

[7] Judge Wright of the Delaware Court in the *General Motors* case (263 F.Supp. 17) followed the decision of this Court in sustaining the validity of Claim 4 (that here involved) but disagreed with Judge Robson in allowing plaintiffs' motion for summary judgment. In his opinion he pointed out numerous unresolved factual issues which formed the basis for his denial of plaintiffs' motion for a summary judgment. Without restating the issues which he discussed, it is significant to note that he refused, on the issue of infringement, to give effect to a literal reading of Claim 4. Instead, he held that the restrictions placed upon the claim by this Court in sustaining validity must be taken into account. In so doing he stated (page 25):

> " * * * the construction of a claim when its validity is contested controls the construction of that same claim when its infringement is alleged. The patentee cannot urge a restrictive interpretation of his claim to avoid invalidity and then an expansive interpretation to ensnare infringers."

This principle has been recognized by this Court. In Fife Mfg. Co. v. Stanford Engineering Co., 7 Cir., 299 F.2d 223, 226, we stated:

> "It is well settled that a patent owner may not apply a narrow construction to his claim to avoid the prior art and then apply a broad construction to include an accused device."

See also Wire Tie Machinery Co. et al. v. Pacific Box Corp. et al., 9 Cir., 107 F.2d 54, 55.

The "new and unexpected result" which plaintiffs urged upon this Court in their argument in behalf of validity, to

which we gave recognition, certainly was not revealed by a literal reading of Claim 4. In fact, we can surmise with some assurance that if a literal reading of the claim had been relied upon, we would have affirmed the District Court in its holding of invalidity in view of the prior art. The patentee's thesis of "new and unexpected result" was based upon the addition to the patent specifications of Examples XIX and XX, filed October 31, 1950, in connection with his continuation-in-part application, Serial No. 413,490. These Examples, which gave formulas for soap and borax over phosphate, were included in the patent issued March 4, 1952 and, as stated by plaintiffs on brief, "By issuance of this patent, the Henricks applications were first made available to the public and thereby, for the first time, became public knowledge."

Based upon Examples XIX and XX, the Friedberg tests were made, which formed the basis of this Court's statement that there was evidence of a "new coaction between the soap, borax and phosphate during the drawing process." Judge Wright on this point stated (page 25):

> "The Friedberg tests involved draws conducted under high pressures involving severe deformation of the metal, whereas the GM operation involves much lower pressures. And Henricks, the patentee, himself stated that it is a high pressure operation generating sufficient heat to thaw the meltable pigment which forms a part of his invention. The Court requires the aid of expert testimony to determine whether these differences are, or are not, important."

[8] In the instant case, as in General Motors, there is evidence that the patentee's process recognized by this Court required "extreme temperatures and pressures of from 100,000 to 250,000 pounds Hertz stress." There is also evidence that defendant's alleged infringing process requires

pressures of only "10 to 25,000 pounds Hertz stress." Moreover, the tests relied upon were made in the drawing of wire rods. Plaintiffs had the burden of proof upon a disputed issue as to whether the same result would have been obtained in the drawing of defendant's alleged infringing automobile bumpers.

While these issues are not all inclusive, we think they alone are such as to negate the propriety of a summary judgment.

We might with propriety conclude our opinion at this point. Even so, we think we should discuss the issue of "intervening rights," relied upon by defendant as a defense to the charge of infringement. As already noted, defendant on June 23, 1965, after having first obtained leave of the Court, filed an amended answer setting forth a number of affirmative defenses. (Of such defenses only "intervening rights" is argued here.) Plaintiffs on brief refer to these defenses as "last minute affirmative defenses," even though the amended answer was filed prior to the filing of plaintiffs' second motion for summary judgment. No attack was made upon such defenses by motion to dismiss the answer or otherwise.

Judge Robson in his bench discussion stated:

> "The Court is of the opinion that on this remand it is not within its province to reassess the validity of the patent as it might be affected by the defense of prior public use."

This statement no doubt was based upon the finding of this Court in its previous opinion that the patentee's record date of invention was April 29, 1946, since Claim 4 is identical to Claim 45 allowed by the Patent Office, and defendant may not now assert the October 31, 1950 date. (321 F.2d 234, 235.)

It is not claimed that our holding relative to public use in connection with the issue of validity is *res adjudicata* with

reference to the defense of intervening rights to the charge of infringement. The District Court did not so decide but instead referred the issue to the Master for decision. In doing so, the Court stated:

> "In view of the findings here, I think the affirmative defenses, and I am aware of them, will more or less fall by the wayside and it would be a matter of a reference to the Master, but certainly I am willing to consider any and all matters which may be concerned."

We doubt the propriety of such reference, see Prepo Corp. v. Pressure Can Corp., 7 Cir., 234 F.2d 700, 704, but need not dwell on the point inasmuch as the judgment is to be reversed.

On the state of the record shown, we think it plain that the issue relating to the defense of "intervening rights" remains before the Court and must be resolved on the record made in this case, which is quite different from that previously before this Court.

There is evidence that defendant commenced use of the alleged infringing process as early as April 25, 1949, more than one year prior to the filing of the continuation-in-part application upon which was issued Patent No. 2,588,234, dated March 4, 1952, from which the reissue patent in suit was issued June 7, 1955. Thus, defendant contends that the coaction on which this Court found inventiveness (a soap-borax fixed film over an integral phosphate coating) was not disclosed by Henricks in his earlier but abandoned application; in fact, it was first disclosed in his continuation-in-part application filed October 31, 1950, which matured into the patent in suit.

[9] As previously shown, "the new and unexpected result" which plaintiff urged upon this Court followed the disclosures in Examples XIX and XX, first made a part of the patent

specifications filed October 31, 1950. In fact, Henricks on deposition so admitted. He was asked, "What I am trying to understand, Mr. Henricks, is this: you had no soap-borax over phosphate in your abandoned application?" and he answered, "Correct." Plaintiffs attempt to bridge this gap by arguing that in the abandoned application the "glyceryl borate" was "fully equivalent" to the soap and borax. Whether Henricks' 1946 disclosure was the equivalent of that made in 1950, upon which he obtained an adjudication of validity, is an issue of fact. Graver Tank & Mfg. Co., Inc., et al. v. Linde Air Products Co., 339 U.S. 605, 609, 70 S.Ct. 854, 94 L.Ed. 1097. Moreover, the issue is one for expert testimony.

Also material to the issue under discussion is a matter presented by defendant as newly discovered evidence in connection with its motion to vacate the judgment. On October 29, 1951, Henricks filed with the Canadian Patent Office his application for a patent entitled "Method of Drawing Metal," which was allowed. In the Canadian application Henricks stated that he was entitled to the October 31, 1950 United States filing date under Treaty or Convention Rights of Applicants as it "relates to all claims," because the United States 1950 application was " * * * the first application for patent for the said invention filed in any country by him or anyone claiming under him."

The specifications, including Examples XIX and XX, and the claims, including Claim 4 in suit, of the Canadian patent were identical with the 1950 United States application. Thus, Henricks represented to the Canadian Patent Office that his 1950 United States application disclosed for the first time the soap-borax-over-phosphate, the premise upon which this Court sustained validity.

Plaintiffs on brief make no denial of the facts just recited relative to the proceedings in the Canadian Patent Office. They state:

> "On October 29, 1951, Henricks filed a corresponding Canadian patent application. That application made reference to the continuation-in-part application filed in the United States on October 31, 1950 *for the purpose of obtaining a prior date of invention* under the International Convention and Canadian law insofar as the material in the continuation-in-part application *may* have been added as *'new matter'*. As to that material which *may not* have been added as *'new matter'* in the continuation-in-part application, Henricks is relegated to his filing date in Canada for his date of invention insofar as the Canadian patent is concerned." (Italics supplied.)

This is an admission that Henricks represented to the Canadian Patent Office, apparently for a self-serving purpose, that the disclosure made in his 1950 application in the United States "may have been added as 'new matter.'" The "new matter" referred to, as we understand, consisted of the disclosure made for the first time in Examples XIX and XX of Henricks' 1950 application, which enabled plaintiffs to obtain the "new and unexpected result" urged upon this Court.

Plaintiffs on brief, following the statement lastly quoted, further state:

> "The reference in the Canadian application to the 1950 United States application had no effect upon Henricks' United States patent applications."

[10] We think the accuracy of this statement is open to doubt. Assuming it to be correct, however, it misses the point. The fact that he made an admission to the Canadian Patent Office as to the date of his patent disclosure contrary to that which he previously made to this Court, in which he now persists, relates to his credibility and presents a matter for consideration by the trier of the facts.

We decide nothing more than that summary judgment was improvidently allowed. Anything we have said is not to be construed as a resolution of any factual issue. We have attempted only to point out some of the issues of material fact which, in our judgment, entitle the parties to a hearing.

The judgment appealed from is reversed and the cause remanded for that purpose.

DEVEX CORPORATION et al., Plaintiffs,
v.
GENERAL MOTORS CORPORATION,
Defendant,
Civ. A. No. 3058
United States District Court
D. Delaware
May 23, 1968.

MEMORANDUM OPINION

CALEB M. WRIGHT, Chief Judge.

The matter presently before the Court arises out of plaintiff Devex's motion to amend and supplement its complaint and defendant General Motors (GM) opposition thereto. The central issue underlying the current dispute is whether the doctrine of equivalents may, under the circumstances of this case, be invoked by plaintiff patentee under Claim 4 of its patent. Despite the rather strict limitations imposed upon Claim 4 by the Seventh Circuit Court of Appeals, see Devex Corporation v. General Motors Corporation, 321 F.2d 234 (7th Cir. 1963) and Devex Corporation v. Houdaille Industries, Inc., 382 F.2d 17 (7th Cir. 1967) and specifically adhered to by this Court in a prior opinion in the present case, Devex Corporation v. General Motors Corporation, 275 F.Supp. 310 (D.Del.1967), Devex nevertheless contends that it is not precluded from asserting the doctrine of equivalents against GM. As it reads those prior decisions, particularly the two from the Seventh Circuit, the doctrine of equivalents was nowhere discussed and is not ruled out by implication. They rely instead upon certain language of the Houdaille opinion to buttress their argument that the Seventh Circuit did not intend to foreclose them from properly invoking the doctrine of

equivalents. GM, citing Union Carbide & Carbon Corp. v. Graver Tank & Mfg. Co., 196 F.2d 103 (7th Cir. 1952), counters that the main thrust of each of the above-cited opinions was to severely narrow the scope of Claim 4 in order to sustain its validity, with the result that Devex is not entitled to assert the doctrine of equivalents against it and thereby expand the scope of Claim 4 well beyond that upon which the decision upholding its validity was premised. Understandably, both Devex and GM have attempted to focus the Court's attention on those portions of the Houdaille opinion which can be construed most favorably towards their respective contentions. Devex, as noted previously, attaches particular significance to Judge Major's treatment of the equivalents issue. The problem before Judge Major, however, was whether the disclosure of "glycerol borate" in a prior patent was chemically identical to "soap and borax over phosphate" disclosed by the patent in suit in order to meet Houdaille's defense of "intervening rights." From Judge Major's conclusion that the disclosures of the two patents were identical, however, plaintiff infers that the doctrine of equivalents was not intended to be foreclosed to it and that it should apply, *a fortiori*, to an alleged infringer.

Defendant GM, on the other hand, points to other portions of the opinion which, they contend, show that the doctrine of equivalents was being applied very narrowly, limited to the defense of "intervening rights" and not extended to ensnare possible infringers. The language upon which GM relies appears at 382 F.2d pp. 22-23 of the Houdaille opinion as follows:

> "*** Thus, having obtained a decision of validity on a narrow and restricted basis, they (Devex) now contend, inconsistently we think, that the claim must be applied literally to defendant's alleged infringing process. Such a construction would mon-

> opolize the whole broad field of metal forming with any use of a dry soap and borax over phosphate at any temperature or pressure, regardless of the results." (Parentheses added).

While the parties have pointed out apparently contradictory portions of the Houdaille opinion, they have overlooked a third observation made by Judge Major which clarifies the seeming ambiguity. This is found at the bottom right column of page 23:

> "In the instant case, as in General Motors, there is evidence that the patentee's process recognized by this Court required 'extreme temperatures and pressures of from 100,000 to 250,000 pounds Hertz stress.' There is also evidence that defendant's alleged infringing process requires pressures of only '10 to 25,000 pounds Hertz stress.' Moreover, the tests relied upon were made in the drawing of wire rods. ***Plaintiffs had the burden of proof upon a disputed issue as to whether the same result would have been obtained in the drawing of defendant's alleged infringing automobile bumpers.***" (Emphasis added).

Clearly, neither the narrow construction urged by GM nor the broader construction contended for by Devex was intended by the Seventh Circuit. It is the opinion of this Court that the Houdaille decision, with which this Court concurs, does not stop Devex from asserting the doctrine of equivalents with respect to Claim 4, but Devex may do so only with respect to those processes of GM which involve the same new coaction to produce the same "new and unexpected results" which are effected by soap and borax over phosphate as disclosed in the specifications of Examples XIX and XX of the Devex patent.

At the oral argument counsel for GM indicated that it was his understanding that one could not obtain the same coaction to achieve the new and unexpected results referred to above except through the use of soap and borax over phosphate. (Tr. 14 & 15). At this stage of the proceedings, however, the Court is uncertain as to whether that belief is well-founded.

Devex will, therefore, be allowed to amend its complaint to include any GM process which involves the same coaction to produce the same "new and unexpected results" as are produced by soap and borax over phosphate as disclosed by the specifications of Examples XIX and XX of the Devex patent. All discovery as to any such GM process will be subject to the limitations set forth by this Court in its opinion of November 8, 1967.

Submit order in accordance with the foregoing.

DEVEX CORPORATION et al.,
Plaintiffs,
v.
GENERAL MOTORS CORPORATION,
Defendant,
Civ. A. No. 3058.

United States District Court.
D. Delaware.
Sept. 8, 1970.

OPINION

CALEB M. WRIGHT, Chief Judge.

This is an action for infringement of Claim Four of Reissue Patent No. 24,017. It has been tried on the merits without a jury and the Court has heard posttrial argument.

DISCUSSION

Claim Four is now the creature of judicial construction. Its validity was saved by a narrow reading in the Court of Appeals for the Seventh Circuit, Devex v. General Motors, 321 F.2d 234 (7th Cir. 1963), applied here as the law of the case, Devex v. General Motors, 263 F. Supp. 17, 23-24 (D.Del.1967).[1] It is not the law, and the premise has not been seriously advanced, that proof of literal infringement would entitle plaintiffs to a judgment.

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[1] See also Devex v. Houdaille Industries, 382 F.2d 17, 22-23 (7th Cir. 1967).

In reversing the lower court decision that the process was unpatentable because obvious from the prior art, the Court of Appeals relied on evidence that "new and unexpected results flow from the conjunction of the elements defined in the drawing process * * *." 321 F.2d at 237. The new and unexpected results are not found in the language of the claim, but they are now its essence. Similar processes with different results do not infringe. This Court said in an earlier opinion, "If an allegedly infringing process falls within the literal language of the claim, but can be shown to operate in a different manner from the patented process, then there is no infringement." Devex v. General Motors, 263 F.Supp. 17, 25, 26 (D.Del.1967).[2] Plaintiffs were obliged, therefore, to show by a preponderance of the evidence, that the accused processes duplicated the critical results.

As in many patent cases, the Court found itself confronted with a mass of technical data and analysis. The evidence consisted largely of tests prepared by experts for each side in preparation for litigation. The test results and expert conclusions are conflicting, as might be expected, and, even to a layman, it appears that objectivity, the unremitting master of every laboratory, has not always been a fixed star in the inquiries conducted and presented to the Court. Although the errors, mostly of omission, seem to have occurred from diligence in the pursuit of proof rather than from bad faith or fraud, their presence has compounded the burden of one unskilled in the technology attempting to reach a correct result.

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[2] In Devex v. Houdaille Industries, 382 F.2d 17, 22-23 (7th Cir. 1967), plaintiffs contended that the claim should be applied literally to the accused process. The court said in response, "Such a construction would monopolize the whole broad field of metal forming with any use of a dry soap and borax over phosphate at any temperature or pressure, regardless of the results."

Because the issues are vigorously disputed by learned men of science, the outcome depending entirely on which tests, analyses, and explanations the Court adopts, it is well to recall, as did Judge Kirkpatrick, "that we are engaged in the determination of a dispute between two parties in a court of law, rather than in an excursion into the realm of scientific research, and we must approach the question from the standpoint of the rules which the law has established for resolving the controverted issue." Shimadzu v. Electric Storage Battery Co., 17 F.Supp. 42, 52 (E.D.Pa.1936). In making findings of fact, the Court is not conducting laboratory analyses, but applying a legal judgment to the evidence before it. It is making a determination that facts are proved or not proved, that the party who has the burden on a given issue has sustained it or not. A finding against the party with the burden, as the Court makes here, does not require absolute conviction that the opposing party has proved a contrary case. Any other approach would require judges to know more about the technology of a patent than the experts whose disagreement brings the dispute to court.

Plaintiffs were obliged to prove that a coaction occurs in the accused processes among the soap, borax, and phosphate at high temperatures and pressures, causing new compounds, including but not limited to glassy amorphous compounds, to be formed, and inhibiting the formation of water insoluble compounds. These results were demonstrated by plaintiffs' witness Henry Friedberg and relied on by the Court of Appeals to sustain the claim's validity. 321 F.2d at 234. This Court heard nineteen days of live testimony, which comprised most of the expert opinion relied on by the parties. It has reviewed the evidence and the exhibits offered to it and to the courts which considered validity, and it concludes that plaintiffs have not met their burden in establishing the essential results. The Court has no doubt that defendant's processes are effective, beneficial and an improvement over earlier solu-

tions to their lubricating problems, nor that they utilize some of the learning upon which the patent is based. Use of that learning is not actionable, however, unless it produces the critical results.[3]

THE NEW COMPOUNDS

Plaintiffs' expert Henry Friedberg was again a key witness at the infringement trial. Plaintiffs relied almost solely on his tests and analyses to show that the new compounds are formed in the accused process. The Court was not comfortable, however, with Friedberg's reliance on his earlier experience with tests on the patented process to justify shortcuts in analysis of the accused ones. He failed to repeat his tests on the accused processes, to develop any standard charts, and to make any tests on the accused process without borax; he was quick to accept minimal evidence to identify the purported new compounds. His conviction was no substitute for the doubts implanted by probing crossexamination, and the Court was unpersuaded that the coaction occurred and new compounds formed even before defendant began its case.

The testimony of Dr. Martin Buerger concluded the issue. Dr. Buerger was a convincing witness, confident in his methods and his conclusions yet honest in their limitations. He found no evidence of the new compounds identified by Friedberg, and plaintiffs did little to shake the strength of his testimony. His conclusions were in accord with the findings of defendant's other expert, Dr. Cheever, and although Dr.

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[3] Varying the proportion of borax for the heavier draws with Bonderlube 246, for example, is taught by the prior art Whitbeck patent.

Cheever lacked the confident demeanor and commitment to objectivity displayed by Dr. Buerger, that they should agree on this point is significant, and it strengthens the finding that defendant's evidence was on the whole more convincing.

AMORPHOUS COMPOUNDS

Plaintiffs relied on the results of Friedberg's X-ray charts to establish the existence of the glassy amorphous compounds supposedly produced by the coaction. It is undisputed however, that in most cases such compounds are not discoverable, much less identifiable by X-ray analysis. Friedberg admitted that the basis for his conclusion, the flattening out of the tracings, could be due to the wiping action of the deformation process. The Court could not conclude that the amorphous compounds were present when the only evidence was a test not designed to disclose them.

WATER INSOLUBLE COMPOUNDS

The debate centered around zinc stearate, since it was that substance which was created by the prior art German process and the inhibition of which Henricks, the patentee, specifically claimed as an advance. On this issue again, there was no reason to disbelieve Friedberg's statement that he found no zinc stearate, but his failure to identify, or even to search extensively for, the peaks at the low angles was unsettling. When defendant's explanation that the low angle peaks actually represent a type of basic zinc stearate, admittedly not recorded in the ASTM files but chemically logical nevertheless, was presented, the Court found itself in a quandary.

Although Friedberg discovered upon reexamination that the mysterious peaks corresponded to those for barium

stearate given in the ASTM files, plaintiffs did not present a chemical analysis of the substance either as produced by defendant or as found in residue after boiling a workpiece. The innuendoes that defendant had created a new substance and was being less then honest about its composition were not supported by proof, and the Court would not prefer them to evidence when no reason to doubt credibility or to suspect fraud appeared. Defendant had at least a standoff, and the plaintiffs, having the burden on the issue, must suffer the facts to be found against them.

Having found these three groups of facts, as well as others not discussed herein, against the plaintiffs, the Court must enter a judgment for defendant, and will do so upon submission of a proper order.

The foregoing and the findings of fact and conclusions of law which follow are made in compliance with Rule 52(a), Fed.R.Civ.P., 28 U.S.C.

FINDINGS OF FACT

1. The plaintiffs herein are as follows:

Devex corporation, an Ohio corporation located at Lakewood, Ohio;

Technograph, a North Carolina corporation having its principal place of business at 920 Northwest Boulevard, Winston-Salem, North Carolina;

William C. McCoy, now deceased, a citizen of the State of Ohio residing at 2712 Claythorne Road, Shaker Heights, Ohio;

Theodore A. TeGrotenhuis, a citizen of the State of Ohio residing at 7315 Columbia Road, Olmsted Falls, Ohio;

Frederick B. Ziesenheim, a citizen of the Commonwealth of Pennsylvania residing at 355 Woodside Road, Pittsburgh, Pennsylvania, and one of the attorneys of record for plaintiffs in this action;

Majorie E. TeGrotenhuis, a citizen of the State of Ohio residing at 7315 Columbia Road, Olmsted Falls, Ohio;

William C. McCoy, Jr., a citizen of the State of Ohio residing at Shaker Boulevard, R.D. #3, Chargrin Falls, Ohio;

Katherine M. Bassett, a citizen of the State of Connecticut residing at 27 Ox Ridge Lane, Darien, Connecticut.

2. Defendant General Motors Corporation, is a Delaware corporation residing in the District of Delaware.

3. The patent in suit is the outcome of an application, Serial No. 665,905, filed April 29, 1946, by the patentee Henricks. This application was abandoned in favor of a continuation-in-part application filed October 31, 1950, which issued as United States Patent No. 2,588,234, dated March 4, 1952. Application for reissue of Patent No. 2,588,234 was filed March 1, 1954 and on June 7, 1955, issued as Patent No. Reissue 24,017 now in suit. PTO 4—2.

4 Plaintiff Technograph holds all rights in and to Henricks Patent Re. 24,017 save for bare legal title which remains in the individual named plaintiffs. Plaintiff Devex has remained party to this action by virtue of certain reversionary rights. PTO 1,2.

5. Only Claim 4 of the Henricks Patent No. Re. 24,017 is charged to be infringed by defendant in this action. That claim is as follows:

The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing dis-

tributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal.

6. This patent infringement action was originally filed on November 13, 1956, in the United States District Court for the Northern District of Illinois under Civil Action No. 56-C-1912. A similar action was filed against Houdaille Industries in the same Court on May 22, 1957, under Civil Action No. 57-C-892. These Civil Actions Nos. 56-C-1912 and 57-C-892 were consolidated for trial on the issue of validity of Claim 4 of the Henricks Patent No. Re. 24,017. After trial, Judge Edwin A. Robson held Claim 4 of Henricks Patent No. Re. 24,017 invalid. On appeal, the Court of Appeals of the Seventh Circuit reversed and held Claim 4 valid, 321 F.2d 234. After remand, and on plaintiffs' motion, the case as to General Motors was transferred to the District of Delaware on July 16, 1965. The issues are raised in the Amended Complaint filed July 17, 1968 and in the Answer to the Amended Complaint filed August 19, 1968.

7. On January 16, 1967, this Court, by an opinion reported at 263 F.Supp. 17, denied plaintiffs' motion for summary judgment on the infringement issue.

8. Plaintiffs charge that the following metal forming processes of defendant infringed Claim 4 of the Henricks patent as held valid by the Court of Appeals of the Seventh Circuit. PTO 3-19.

A. *Pontiac Bumper Forming Process PTO 3-10*

(1) During 1955 and 1956 prior to commencement of this action, defendant at its Pontiac Motor Division plant formed automobile bumpers in progressive dies after Spra-Bonderite 111X had been applied to form a phosphate coating and

after Bonderlube 246 had been applied in a dilute solution to the phosphate coating and dried. PTO 3.

(2) Spra-Bonderite 111X was an acid zinc phosphate solution containing 12.0% Zn, 9.3% NO_3, 29.2% PO_4 and the balance water. The Bonderlube 246 in its dry state contained 15% borax and the balance sodium stearate-sodium palmitate soap. PTO 3.

(3) After flat steel blanks had been polished on one side to the finish desired on the bumper part prior to electroplating, and after the polished blanks had been spray cleaned in a Parco No. 341 cleaning solution and rinsed in hot water, Spra-Bonderite 111X phosphating solution was sprayed onto the blanks at a temperature of about 140° F to 150° F for 50 seconds. The phosphating step was then followed by cold and hot water spray rinses. PTO 4-5.

(4) The phosphate coated blanks were then rinsed in a hot solution of Parcolene 21 and water, and the excess solution thereafter removed from the surface with rubber squeegee rolls. Parcolene 21 in its dry state is 90% borax and 10% sodium nitrite and the Parcolene solution is made by mixing 2 pounds of Parcolene 21 with 100 gallons of water, Parker Specification No. 96, PX 60. PTO 5.

(5) A solution of Bonderlube 246 in water was then roller coated onto the phosphate coated blank at a temperature of approximately 190° F. The Bonderlube solution was prepared for coating and replenished during coating in accordance with the Parker Rust Proof Specification No. 113 PX 61, wherein 100 pounds of Bonderlube 246 were mixed with 100 gallons of water. PTO 5.

(6) The coated blanks were then passed through an infrared drying oven maintained at an interior air temperature of 425° F for a period of 20 seconds to remove the water and form a dry film on the blank. This completed the coating

operation in preparation for cold forming the bumper parts. PTO 5.

(7) The bumper parts comprised the front bumper lower impact bar (Part No. 521374), the front bumper bomb guards (Part Nos. 521424-5, Assembly Part Nos. 521794-5), the front bumper impact bars (Part Nos. 521338-9, Assembly Part Nos. 521771-2), and the rear bumper cross bar (Part No. 518851, Assembly Part No. 518963). The blanks which had been previously subjected to the above-stated lubricating steps, were then formed into the final bumper configuration and also cut, trimmed and pierced in a continuous operation by a series of dies in separate presses. PTO 5-8.

(8) The metal used for the flat steel blanks was a low carbon steel SAE 1008 and 1010 having a thickness of .110 to .097 inch. PTO 9.

(9) After being formed, the bumper parts were cleaned and prepared for electroplating as follows:

(a) The bumper parts were first passed through a three stage washer in which Wyandotte cleaner called Ferlon (an alkaline solution) was sprayed on at a temperature of approximately 180° F. PTO 9.

(b) After drying, the bumper parts were inspected and hand polished, when necessary, to remove spot defects and burrs. PTO 9.

(c) Then the bumper parts were put through a power washer in which they were sprayed with Wyandotte No. 38 alkaline cleaner at approximately 180° F for about 3 to 3½ minutes. PTO 9.

(d) The bumper parts were then rinsed in hot water for about one minute. PTO 9.

(e) The bumper parts were then immersed for approximately 4 minutes in a McDermid cleaner at a temperature of

180° F. The McDermid cleaner included sodium hydroxide, trisodium phosphate and sodium carbonate. PTO 9.

(f) The bumper parts were then rinsed in cold water for approximately ½ minute, placed in an acid dip of 10% sulphuric acid by volume for ½ minute, and then rinsed in cold water. PTO 9.

(g) After cleaning, the bumper parts were inspected for defects and, when necessary, spot polished by hand. PTO 10.

(10) The cleaning steps and cleaning materials and solutions used in cleaning the surfaces of the bumper parts after drawing and prior to electroplating, as above described in subparagraphs (a) to (f) of paragraph (9), were the same as those used in Pontiac's prior bumper forming process wherein a lubricant Mar-Proof, described as a "sticky oil" or a "sticky gunk," was applied prior to forming. The cleaning steps gave the same results in the BL 246 process as in the prior Mar-Proof process. PTO 10.

B. *Valve Lifter Plunger Process PTO 10-15*

(1) Defendant commercially cold formed in an extrusion operation hydraulic valve lifter plungers from ferrous metal slugs during 1955 and 1956 at its Diesel Equipment Division prior to commencement of this action. Prior to extrusion, Bonderite 181X was applied to form a phosphate coating on the slugs and then Bonderlube 235 was applied in a dilute solution to the phosphate coating and dried. PTO 10-11.

(2) Bonderite 181X was an acid zinc phosphate solution containing 13.6% Zn, 18.3% NO_3, 15.7% PO_4 and the balance water. The Bonderlube 235 in its dry state contained 3% borax, 2% sodium nitrite, and the balance sodium stearate soap. PTO 11.

(3) After the slugs, which were of SAE 1012 low carbon steel, had been washed, grit blasted and annealed to secure a

hardness of approximately RB 50 and a tensile strength of 35,000 to 50,000 p.s.i., and after they had been dipped in a pickling bath and rinsed in hot water, they were immersed for a period of 5 minutes in a Bonderite 181X phophating solution which was maintained at a temperature of approximately 185° to 190° F, thus forming on and integral with the surface a phosphate coating. PTO 11-12.

(4) The phosphate coated slugs, after a cold water rinse, were then immersed for one minute in a solution of Parcolene 21 and water at room temperature. PTO 12.

(5) The phosphate coated slugs were thereafter immersed for a period of approximately 5 to 7 minutes in a solution of Bonderlube 235 and water maintained at a temperature of approximately 165° F. The Bonderlube 235 solution was prepared for coating and replenished during coating in accordance with the Parker Rust Proof Specification No. 96, PX 60, wherein 56 pounds of Bonderlube 235 were mixed with 100 gallons of water. PTO 13.

(6) The slugs were then dried to remove the water and form a dry film on the slugs. PTO 13.

(7) The slugs which had been previously subjected to the above-stated lubricating steps, were fed (2 slugs at a time) into a Verson circular dial feed press. The press had 12 stations, PX 81. With each stroke, it simultaneously loaded two slugs, sized two slugs to a cylindrical shape having a length of approximately 0.640 of an inch and a diameter of approximately 0.625 of an inch, extruded two slugs, pierced two slugs, coined two slugs and unloaded two slugs. The press production rate was 30 strokes (60 plungers) per minute. Upon unloading, the extruded plungers were approximately 1.180 inches long and 0.635 of an inch in diameter. PTO 13-14.

(8) After the press operations, the plungers were then cleaned in a single stage Detrex Rotary Drum washer,

rotating on its horizontal axis, with advancing flights on the inner peripheral surface of the drum. As the formed plungers tumbled and advanced through the washer, Parco 532 cleaner (a mild acid type solution) was sprayed on them at a temperature of approximately 165° to 170° F, the spray solution forming a pool at the bottom of the washer. The parts were in contact with the cleaning solution for about 2 to 3 minutes. PTO 14.

(9) Prior to introduction of the above-designated procedures, the valve lifter plungers were machined from solid bar stock. PTO 14.

C. *Pontiac Rocket Forming Process PTO 15-19*

(1) Defendant cold formed in an extrusion process from metal billets rocket heads and rocket motor bodies for the United States Government at its Pontiac Motor Division plant during 1952 and 1953 after issuance of patent No. 2,588,234 on March 4, 1952. Prior to extrusion, Bonderite 180X was applied to form a phosphate coating and then Bonderlube 235 was applied in a dilute solution to the phosphate coating and dried. PTO 15.

(2) The steps generally followed in the production of the rocket head at Pontiac are recited in PX 87 and PX 88 and are pictorially shown in the photograph on page 1 of PX 91. PTO 15.

(3) After the metal billets had been cleaned, they were immersed for a period of approximately five minutes in a Bonderite 180X phosphating solution which was maintained at a temperature between 180° and 200° F, thus forming on and integral with the surface of the ferrous metal a phosphate coating. Bonderite 180X was an acid zinc phosphate solution and was prepared for coating in accordance with the Pontiac Process Specification, PX 88. PTO 15, 17-18.

(4) After a cold water spray rinse, the phosphate coated billets were sprayed with a solution of Parcolene No. 20 and water at a temperature between 160° and 180° F for ½ a minute. Parcolene No. 20 in its dry state is 66.6% borax and 33.4% sodium nitrite. The Parcolene No. 20 solution was prepared for coating in accordance with Pontiac Process Specification, PX 88. PTO 18.

(5) The phosphate coated billets were thereafter immersed for a period of 5 minutes in a solution of Bonderlube 235 and water maintained at a temperature between 180° and 200° F. The Bonderlube 235 solution was prepared for coating in accordance with the Pontiac Process Specification, PX 88. The billets were thereafter dried to remove the water and form a dry film on their surfaces. PTO 18-19.

(6) The process followed in defendant's production of rocket motor bodies is set forth to some extent in PX 89. It has been agreed by and between the parties that with regard to infringement, the findings of this Court with regard to the rocket head process shall be controlling and conclusive as to the rocket motor bodies. PTO 19.

9. Plaintiffs offered evidence to prove that the accused processes not only embodied the process steps set forth in Claim 4, but also achieved the same new and unexpected results upon which the Court of Appeals relied to sustain validity. Devex v. General Motors, 321 F.2d 234 (7th Cir. 1963). Plaintiffs attempted to show, inter alia, that,

(a) there was a new coaction among the soap, borax and zinc phosphate at high temperatures and pressures resulting in the formation of the new compounds referred to by the Court of Appeals, 321 F.2d at 237;

(b) there was a new coaction between the borax and phosphate under high temperatures and pressures resulting in the formation of glassy amorphous compounds, 321 F.2d at 237;

(c) the formation of water insoluble compounds was inhibited and there was no cleaning problem, 321 F.2d at 237;

(d) tool and die life was greatly increased, 321 F.2d at 237;

(e) the use of soap-borax over phosphate spelled the difference between success and failure, 321 F.2d at 237;

(f) there was ferrous metal phosphate in the coatings as required by the claim.

Plaintiffs contended that the claim did not require the inorganic compounds (borax and sodium nitrite) to melt and offered evidence to show that they were *meltable* at a temperature below that of the phosphate. Defendant asserted that melting is required and relied on some of the plaintiffs' evidence and some adduced from its own witnesses to show that the compounds did not and could not melt during its processes.

10. The plaintiffs have failed to prove by a preponderance of the evidence that new compounds are formed in the defendant's accused processes by a coaction among the soap, borax and the phosphate coating on the work pieces.

(a) The plaintiffs submitted in evidence diffractometer charts PX 71 to PX 74 inclusive made by its X-ray diffraction witness Henry Friedberg, to establish the formation of new compounds. Friedberg testified (a) he did not repeat his X-ray diffraction tests, Tr. 539-40, to determine whether the peaks he identified as including new compounds were actual diffraction peaks representing new compounds or random background irregularities; (b) he prepared no X-ray diffraction charts of the accused coatings without borax so as to determine whether the peaks relied upon in the charts PX 71-74 resulted from the presence of borax, Tr. 440-440A; (c) he made no standard charts of the new compounds he claims to have found so as to support his identifications, Tr. 578-79.

(b) At lea three peaks of a diffraction pattern of a compound should be found for reliable identification of a compound. Tr. 498-99, 1173-75, 1459. Friedberg was unable to point to more than one or two peaks of any ASTM listing in the X-ray diffraction spectra on any one of the charts PX 71 through PX 74 as identifying new compounds allegedly formed in defendant's accused processes. Tr. 420-22, 425-27, 431-33, 434-36, 556-64; see testimony correction re PX 72 at 462.

(c) Friedberg selected 13 peaks in the spectra of the charts as identifying new compounds. A majority of these peaks occur at the same 2-theta angle locations as zinc phosphate peaks. Tr. 1450-58. Zinc phosphate consitutes a large portion of the coating of the accused processes, Tr. 1294, and a satisfactory identification of a new compound by a peak at the same 2-theta angle as zinc phosphates peak cannot be made. Tr. 505, 1450-57. Other of the peaks selected by Friedberg on charts PX 71, 72 and 74 as identifying new compounds appear to be of size and shape similar to the zig-zags of the spectra caused by background radiation. Tr. 1451-54, 1457-58; PX 69. A chart of Bonderlube 215 (no borax) over phosphate has peaks at the same 2-theta angles where boron compounds were identified by Friedberg in PX 71 and PX 72. Tr. 570-71, 573-74. The X-ray diffractometer charts PX 69 and PX 71 through 74 inclusive and the testimony of the witnesses do not establish that new compounds are formed in defendant's accused processes by a coaction between the borax and the phosphate coating.

(d) Dr. G.D. Cheever, a chemist employed by defendant, testified that the patterns of peaks of the X-ray diffractometer charts of the accused BL 235 and BL 246 coatings do not reproduce and do not match the patterns of peaks of the standard zinc borate and boron phosphate X-ray diffractometer charts and patterns of peaks of ASTM sodium boron phosphate and all other possible boron compounds. Tr. 1353-72,

1402-14, 1459-61. No new compounds are formed in the accused processes before or during the drawing operations by any coaction between the borax and the phosphate.

(e) Defendant's witness Abram Davis, is an expert in infrared analytical techniques. Tr. 2083-85. The infrared patterns of his charts of the accused BL 235 coating, the TD-1286-Q coating (no borax) and the German process coating are substantially the same. Tr. 2088. There is no evidence in the BL 235 infrared chart indicating that new compounds are formed by any coaction between the borax and the phosphate. Tr. 2088.

(f) Dr. Martin J. Buerger testified as an expert in analyzing defendant's powder photographs of the accused processes. He is Professor Emeritus at Massachusetts Institute of Technology and Professor at the University of Connecticut. He has been engaged in the study of crystal structures and the use of X-ray diffraction for 38 to 40 years Tr. 1107-1123A, 1125; DX 361.

An advantage of an X-ray powder photograph over an X-ray diffractometer strip chart is that the bursts of radiation are integrated uniformly over the entire film and do not interfere with the resolution and intensity of the lines resulting from beams diffracted by compounds. Tr. 1657-58, 1166-68, 1170-71. The powder photograph method using the Guinier camera is an accepted method and machine for analyzing materials by X-ray diffraction. DX 376A-C.

The photographs were taken of samples prepared, in accordance with established practice, by removing the coatings as a powder from the supporting surfaces and placing the powder particles in a holder through which the X-ray beams were directed. Tr. 1490-91, 1493-94; DX 250. The removal of a powder sample from its substrate is a standard way of preparing a sample for a powder photograph and such removal

does not change the characteristic diffraction pattern as to the location of the lines. Tr. 1174-75, 1174; DX 250.

The patterns of lines of the powder photographs of the accused Bonderlube 235 and Bonderlube 246 coatings do not reproduce and do not match the patterns of lines of the standard zinc borate and boron phosphate powder photographs, or the patterns of lines of the gauge strips of other ASTM boron compounds and compounds identified by Friedberg as new compounds. Tr. 1679-94, 1717-22, 1729-35. Also, the pattern of lines of the powder photographs of the accused BL 235 and BL 246 coatings are substantially identical with the patterns of lines of the reference powder photographs of the BL 232 (soap without borax) and BL 248 (soap without borax). Tr. 1688, 1717-22, 1729. No new lines which would indicate the possible formation of new compounds due to the presence of borax appear in the BL 235 and BL 246 photographs as compared to the BL 232 and BL 248 reference photographs. Defendant's powder photographs of samples of the accused processes and of samples of soap without borax are persuasive that no new compounds are formed in the accused processes before or during the drawing operations by any coaction between the borax and the phosphate.

(g) The necessary conditions for starting and continuing reactions to form new boron compounds are not present in defendant's accused processes. Tr. 1480-83, 1645. Such reactions require high temperatures, above 600° C (1100° F), a reaction time of several hours at such high temperatures, and high concentrations in the solutions.

(1) In none of defendant's processes do the coatings become heated to temperatures in excess of 600° C (1100° F). Tr. 79, 1481.

(2) The heating of the coating in defendant's processes occurs in a second or a fraction thereof and not over the period of hours required for a reaction. Tr. 1481.

(3) Defendant's processes involve only dilute solutions of BL 235 and BL 246 which do not contain high concentrations of reacting ions which must move through a system and come in contact with other ions to form new compounds. Tr. 1481.

(h) There was testimony that zinc borate may be formed out of a cold concentrated borax solution by adding zinc sulphate or zinc chloride. Tr. 2590. However, defendant's solutions are dilute and do not contain zinc sulphate or zinc chloride. Tr. 2608; PTO 10, 18.

11. Plaintiffs have failed to establish by a preponderance of the evidence that glassy amorphous compounds are formed in the defendant's accused processes during the drawing operations.

(a) The evidence presented by plaintiffs analyzing samples of the coatings of the accused processes on the issue of whether glassy amorphous compounds are formed by any reaction of the borax and the phosphate coating were X-ray diffractometer charts PX 69 to PX 74, inclusive, and the testimony of plaintiffs' witness Friedberg with respect to those charts. Tr. 428, 523-531.

(b) Amorphous compounds are non-crystalline and are not detectable by X-ray diffraction methods, the only analytical method pursued by plaintiffs on the glassy amorphous compound issue. Tr. 523, 524, 528a, 529, 578.

(c) The reductions in the sizes of the peaks and the smoother appearances of the spectra in X-ray diffraction charts PX 72 (BL 246) and PX 74 (BL 235) of samples after the drawing operation as compared to charts PX 71 (BL 246) a PX 73 (BL 235) of samples before the drawing operation do not establish that glassy amorphous compounds are formed by a reaction of the borax with the phosphate coatings. Tr. 527-28, 531, 1461-62. The pattern in X-ray chart PX 70 (BL 215, soap without borax, over phosphate after forming) is also

smoother with lower peaks than the pattern of PX 69 (BL 215 over phosphate before forming). Tr. 575-78. The reduction in size of the peaks on PX 72 and PX 74 is not shown to have been caused by any action differing from that which occurred as to PX 70 and which must have been an action unrelated to the presence of borax.

(d) Defendant's X-ray diffraction expert Dr. Cheever testified that reduction in the peak heights and the smoothing down of the spectra in X-ray diffraction charts PX 70, 72 and 74 of drawn samples occurs because during the drawing operation the coating is spread over more surface area as the metal stretches and flows and some of the coating is wiped off by the dies, thereby leaving less material at any one area to diffract the X-ray beam. Tr. 1461-62. Plaintiffs' witness Friedberg conceded that this wiping action was possible and that peaks can disappear due to other reasons than the formation of amorphous compounds. Tr. 527-28, 531. There is no record evidence demonstrating that the reduction in size of the peaks on PX 72 and PX 74 is due to the action of the borax, rather than this wiping action.

(e) Plaintiffs' witness Friedberg was unable to identify by name or formula any particular glassy amorphous compound in the samples of the charts PX 72 and PX 74 which he contended had been formed. Tr. 524, 528-29, 576-78. He did not distinguish the glassy amorphous compounds he contended were shown by charts PX 72 and PX 74 from those he stated were shown in PX 70 (no borax). Tr. 575-78. Nor did he distinguish the glassy amorphous compounds which he contended were shown by charts PX 72 and PX 74 from the glassy amorphous compounds which the prior art Orozco-Henricks patent 2,469,473 (DX 1) discloses are formed by the use of a soap-borax lubricant over metal without phosphate during the drawing operation.

12. The plaintiffs have not established by a preponderance of the evidence that the formation of water insoluble organic compounds is inhibited by borax in the defendant's accused processes.

(a) Plaintiffs' X-ray diffractometer chart PX 74 shows that the borax does not inhibit the formation of water insoluble compounds in defendant's BL 235 process. Friedberg failed to recognize the presence of basic zinc stearate in his X-ray chart PX 74 of defendant's BL 235 process which is shown by a number of new high peaks formed at 2-theta angles 5.5, 8.2 to 8.4 and 11. Tr. 565-69, 1349-50. The peaks at those angles agree with the water insoluble basic zinc stearate peaks at the same positions in defendant's standard basic zinc stearate X-ray chart DX 313-II and their relative intensities are the same. Tr. 1349-50. Dr. Cheever identified the new high peaks in PX 74 as basic zinc stearate peaks. Tr. 1349-50.

(b) Plaintiffs did not make the test of boiling in water any samples of the accused processes to determine whether or not water insoluble organic compounds formed any part of the coatings thereof. Tr. 348-49, 586-87.

(c) The infrared patterns run by Davis of Hooker Chemical Corporation on samples of BL 235, TD-1286-Q (no borax) and the German process, all over zinc phosphate, showed a characteristic at the 1600 reciprocal centimeters band which was not in the infrared pattern of USP zinc stearate. Tr. 1900. Hooker's Miss Hartinger, a qualified analytical chemist, after a review of the literature, produced in May 1965 a basic form of water insoluble zinc stearate whose infrared pattern included a strong infrared band at 1600 and matched the patterns of the coatings of the BL 235, TD-1286-Q and the German process. Tr. 1906-08.

(d) A sample of Miss Hartinger's May, 1965 batch of water insoluble basic zinc stearate was used by Dr. Cheever in mak-

ing his standard X-ray diffractometer charts, DX 313-I, II and III, and DX 317. Tr. 1908-09, 1336-37, 1398, 1566-67. A sample of basic zinc stearate from a second batch produced by Miss Hartinger in June, 1965 which also gave the same strong 1600 infrared band, Tr. 1912-13, was used as the water insoluble basic zinc stearate standard in making powder photograph MSU 5a (DX 256a). Tr. 1600.

(e) The Buerger powder photographs disclose that the pattern of lines of the water insoluble basic zinc stearate standard photograph (DX 256a) are matched by the patterns of lines in the BL 235 photographs (DX 260a, 257a) and by the pattern of lines in the BL 246 photograph (DX 261a) as well as by the patterns of lines in the BL 232 and BL 248 photographs (DX 262a, 264a) with no borax. Tr. 1671-77, 1723-24. The line patterns of basic zinc stearate in the photographs of samples of the accused BL 235 and BL 246 processes are the same as the line patterns of basic zinc stearate in the BL 232 and BL 248 photographs without borax. Tr. 1674-75, 1724. This matching of lines in the powder photographs indicates that water insoluble basic zinc stearate is formed in the coatings of the accused processes and that the presence of 3% borax or 15% borax does not inhibit its formation.

(f) Cheever's X-ray diffractometer charts disclose that the pattern of peaks with the same peak intensities and locations of the standard X-ray diffractometer charts (DX 313-I, II and III) of water insoluble basic zinc stearate prepared by Miss Hartinger, is reproduced in each of the spectra 3 to 9, inclusive, on X-ray chart DX 327 of samples of coatings of the accused BL 246 process and the BL 248 process (no borax). Tr. 1340-43. The pattern of peaks with the same peak intensities and locations of the standard X-ray diffractometer chart (DX 317) of basic zinc stearate prepared by Miss Hartinger, is reproduced in each of the spectra 3 to 7, inclusive, on X-ray chart DX 320, of samples of coatings of the accused BL 235

process and the BL 232 process (no borax). Tr. 1394-1402. The matching of the basic zinc stearate patterns of peaks of the standard charts (DX 313, 317) with corresponding patterns of peaks in all spectra on charts DX 327 and DX 320 made from samples having BL 248 (soap only), BL 246 (soap-borax), BL 232 (soap only) and BL 235 (soap-borax) indicates that water insoluble basic zinc stearate is formed in the coatings of the accused processes and that the presence of 3% borax or 15% borax does not inhibit its formation.

(g) At the time of his early X-ray diffractometer charts of samples of the accused coatings, Dr. Cheever was unable to identify the basic zinc stearate peaks because that material was not recorded in the ASTM listings. Tr. 1316-1322. To determine whether a water insoluble compound was present in the coatings, he then boiled the accused samples in water and found that a whitish, waxy material was still present after boiling, which indicated that the whitish, waxy material was water insoluble. Tr. 1318. Chemical analysis of this boiled material determined that it contained zinc, carbon, hydrogen and oxygen, the elements of zinc stearate. Tr. 1320-21, 1517. X-ray diffraction charts (DX 318-I and II) show that the pattern of peaks of a boiled BL 235 sample closely matched the pattern of peaks of USP zinc stearate of the ASTM listing and no longer match those of an unboiled sample. Tr. 1319-20, 1323-27. Boiling of water insoluble basic zinc stearate in water converts it to water insoluble USP zinc stearate of the ASTM listing. Tr. 1319-20, 1323-27.

(h) Jones boiled in water both drawn and undrawn phosphated samples coated with the accused BL 235 and BL 246 lubricants and both drawn and undrawn phosphated samples coated with BL 248 (soap only) and the German material. He determined that a water insoluble organic compound remained on each of the samples after boiling. Tr. 1958-59, 1984-86, 1989-92, 1962-64. This water insoluble organic

compound had been formed by a reaction between the zinc phosphate and the soap (DX 383). Neither Dr. Gibson nor Mr. Leland could remove by hot water the water insoluble organic compound formed by BL 235 over phosphate. Tr. 2199-2202; 847-48.

(i) McCullough of Hooker analyzed drawn and undrawn samples of the accused BL 235 process, TD-1286-Q (no borax) and the German process by the potentiometric titration method and determined that the coatings of each sample contained zinc stearate. Tr. 2107. Although he did not know the exact form of the zinc stearate, he had no doubt that the material he had found was a zinc stearate and that it was water insoluble. Tr. 2107.

(j) The uncontradicted testimony of record establishes that the Bonderlube 235 formula using 3% borax, 2% sodium nitrite and 95% reactive soap and applied over phosphate in an aqueous solution was developed by Parker for the specific purpose of generating in a period of a few minutes the same water insoluble zinc stearate formed by the German process over a period of 15 hours. Tr. 843-48, 2186-2204. The 3% borax served as a buffer and maintained the pH content at the desired level to enhance the reaction between the zinc phosphate and the reactive soap. Tr. 843-48, 2186-2204. The 2% sodium nitrite served as an anti-corrosive substance, Chicago Tr. 800-802, and there is no evidence that the sodium nitrite reacts or coacts with any other elements to form new compounds or perform the function of a meltable solid inorganic compound.

(k) The use of 15% borax in the accused BL 246 process is in accordance with the disclosures of the prior art Orozco-Henricks patent 2,469,473, DX 1, Col. 8, lines 5-19, and prior art Whitbeck patent 2,470,062, DX 3, wherein soap-borax lubricants are used over bare steel. The Whitbeck patent teaches that the borax to soap ratio may be varied from

one metal forming process to another for a number of reasons, and that

(1) A higher soap content provides better lubrication at lower temperatures and a higher borax content provides better lubrication at higher pressures and higher temperatures, Col. 3, lines 11-15;

(2) The physical characteristics of the metal, the type of dies, die tolerance and clearance and surface finish and depth and complexity of the draw must be considered, Col. 3, lines 38-42;

(3) Deep draws and resultant high pressures and temperatures usually require a higher borax to soap ratio than lighter draws with lower temperatures and pressures, Col. 3, lines 45-48;

(4) The proper soap to borax ratio may be determined by a few trials with the particular dies and metal stock to be used, Col. 3, lines 62-66.

(l) The pattern of peaks in Curve 1 of the standard control chart DX 313-I, Curve 2 of DX 313-II and Curve 2 of DX 313-III, cannot establish the presence of barium stearate, as plaintiffs contend. Those standard charts were run on samples of Hooker or basic zinc stearate prepared by Miss Hartinger from known elements of which barium was not one. Tr. 1906-09. The same pattern of peaks occurs in the X-ray diffractometer charts of the accused coatings, DX 320, 322, 327 and PX 74, and barium is not present in those coatings. Chemical analysis of Miss Hartinger's basic zinc stearate also showed that barium is not present. Tr. 1320-21. In any event, the sample used by Dr. Cheever for the standard charts DX 313-I, II, and III, was water insoluble, as were the residues recovered from the coated work-pieces after boiling in water. Tr. 1319-20.

13. Plaintiffs have not shown by a preponderance of the evidence that the accused processes left defendants with no cleaning problem. In none of the processes was it possible to remove by hot or boiling water the water insoluble organic soap film left in the coating after the draw.

(a) Alkaline cleaners were unable to remove the residue of the BL 235 in the plunger process, and a mild acid type solution (Parco 532) was necessary. Tr. 790.

(b) Hot water would not remove the residue of the BL 235 rocket process. A strong alkaline cleaner containing 20% caustic was necessary. PX 99, pp. 44-45.

(c) The BL 246 bumper process required the same multistep chemical cleaning process as the previous process using a sticky oil. PTO 10. Defendants used Wyandotte, Ferlon, McDermid and sulphuric acid cleaners, PTO 10, the same cleaners used before, and there is no indication of improvement with BL 246.

The cleanability tests performed by Dr. Rabinowicz and Friedberg would have been more persuasive if they had been able to more closely approximate operating conditions and if they had used parts deformed under heat and pressure with the lubricant thereon. Tr. 95-104, 334, 449-50, 450-57. In any event, they did not demonstrate that the films were removable without a "cleaning problem."

14. The plaintiffs have failed to prove by a preponderance of evidence that the die life was greatly increased, as discussed by the Court of Appeals of the 7th Circuit (321 F.2d at 237).

(a) As to the accused BL 246 Pontiac bumper forming process, the dies lasted the entire 1956 model run but so did the previous dies where the Marproof (sticky oil) lubricant was used. Tr. 715; PX 103, p. 39. The 1956 dies of the accused process still had to be stoned periodically to eliminate die loading and pickup so as to prevent galling and scratching of

the parts, and hand polishing to eliminate scratches and scoring also was still necessary, although to a lesser degree. Tr. 694-95, 715. It was still necessary to apply tallow or grease over the dried film to aid in lubrication of areas where deep draws occurred. Tr. 708.

(b) There is no evidence that die life was increased by the accused BL 235 plunger process. The plunger formerly was machined out of solid bar stock, which did not involve dies. Tr. 760-61.

(c) The accused BL 235 process did not greatly increase tool and die life in the extrusion of the rocket at Pontiac. Until the time the rocket contract was cancelled by the U.S. Government, the dies and punches continued to break. The BL 235 process did not prevent that breakage. Tr. 730, 750; PX 97, pp. 24-25. The rocket dies had a shorter life than the life of Pontiac's regular automobile production dies, although BL 235 was used over phosphate. Tr. 750-51.

(d) In his tests plaintiffs' witness Lenz formed only 24 or 25 pieces using BL 215 (no borax) over phosphate, only 24 or 25 pieces using BL 235 over phosphate and only 24 or 25 pieces using BL 246 over phosphate. Tr. 308-09, 311. The effect of different lubricants on die life can only be determined by extended periods of use wherein many thousands of pieces are used and examined. Plaintiffs' Court of Appeals Brief, page 9. Lenz stated that one BL 215 piece had a burr, one BL 235 piece had no burr and one BL 246 piece had no burr. Tr. 291-92. He did not examine the other BL 215, BL 235 and BL 246 pieces. Tr. 311. In the accused BL 246 process as used in production, burrs were formed and had to be removed in a separate operation. PTO 9.

CONCLUSIONS OF LAW

Upon the foregoing findings of fact, the Court concludes as a matter of law as follows:

1. The Court has jurisdiction of the parties and the subject matter of the issues raised by the pleadings of the parties herein.

2. Plaintiffs have the burden of proving patent infringement by a preponderance of the evidence.

3. The construction of a claim when its validity is contested controls the construction of that same claim when its infringement is alleged. The patentee cannot urge a restrictive interpretation of his claim to avoid invalidity and then an expansive interpretation to ensnare infringers. *Devex v. General Motors*, 263 F.Supp. 17, 25 (D.Del.1967); *Devex v. Houdaille*, 382 F.2d 17, 23 (7th Cir., 1967).

4. Plaintiffs have not shown by a preponderance of the evidence that the accused processes achieve the same "new and unexpected results" which formed the basis of the holding of validity of Claim 4 of the Henricks patent in suit by the Court of Appeals for the Seventh Circuit.

5. There is no preponderance of the evidence in favor of plaintiffs that in the accused processes (a) there is a new coaction between the soap, borax and phosphate, (b) new compounds or glassy amorphous compounds are formed, (c) the formation of water insoluble organic compounds is inhibited, (d) tool and die life is greatly increased, and (e) there is no cleaning problem, or that any of these results is achieved. The credible evidence is to the contrary and preponderates in favor of defendant.

6. Defendant's bumper forming process practiced at its Pontiac Motor Division plant during 1955 and 1956 using Bonderlube 246 over a zinc phosphate coating formed from

Spra-Bonderite 111X was not an infringement of Claim 4 of Henricks Patent No. Re. 24,017.

7. Defendant's extrusion process practiced at its Diesel Equipment Division plant in 1955 and 1956 in the forming of valve lifter plungers using Bonderlube 235 over a zinc phosphate coating formed from Bonderite 181X was not an infringement of Claim 4 of Henricks Patent No. Re. 24,017.

8. Defendant's rocket forming process practiced at its Pontiac Motor Division plant during 1952 and 1953 in the forming of rocket heads and rocket motor bodies for the United States Government using Bonderlube 235 over a zinc phosphate coating formed from Bonderite 180X was not an infringement of Claim 4 of Henricks Patent No. Re. 24,017.

9. Defendant is entitled to entry of a judgment dismissing the Amended Complaint herein and awarding defendant its taxable costs on the infringement issue.

MEMORANDUM OPINION OF JUDGE WRIGHT
December 16, 1970

WRIGHT, Chief Judge.

On September 8, 1970 this Court, after nineteen days of trial on the sole issue of infringement, rendered an opinion and entered Findings of Fact and Conclusions of Law.

On October 1, 1970, the plaintiffs Devex et al., filed a motion to amend the Court's Findings of Fact and to make Additional Findings.

The motion requested the Court to modify the second paragraph on page 9 of the Pre-trial Order and to amend Finding of Fact 8 A (8) by deleting "having a tensile strength of from 30,000 to 32,000 p.s.i." Subsequently by letter to the Court dated October 15, 1970 the defendant agreed "to the

modification of the second paragraph on page 9 of the Pretrial Order and the amendment of Finding of Fact 8 A (8). Although the Findings of Facts reported in 316 F.Supp. 1376 were printed with Finding of Fact 8 A (8) modified as agreed upon, the opinion as filed as a part of the official record in the case did not delete that portion of 8 A (8) as requested and agreed upon. A form of order amending claim 8 A (8) by deleting "having a [3] tensile strength of from 30,000 to 32,000 p.s.i." may be submitted by the plaintiffs. The Court will sign the order so that this aspect of the record will be complete.

The second prong of the plaintiffs' motion asks the Court to make additional Findings of Fact as follows:

> "(1) The combination of soap-borax over phosphate as the lubricant in the patented process is adequately disclosed in Henricks' original 1946 patent application and the patented process, including this embodiment, is entitled to the April 29, 1946 filing date as the date of invention (PB 83-99).
>
> (2) The petition for priority in Henricks' corresponding Canadian patent application is not an admission against interest as to a later invention date for the soap-borax over phosphate embodiment of the patented process as defendant alleges but rather was an unintentional clerical error (PB 100-102).
>
> (3) Henricks' reported testimony in the Houdaille deposition, pertaining to an alleged admission that soap-borax over phosphate is not disclosed in his original 1946 patent application was a reporting error and is not an admission against interest of an invention date for this embodiment of the patented process subsequent to the filing date of the original 1946 patent application (PB 102-104). [4]

(4) The soap-borax over phosphate practice at Standard Steel Spring is not prior art to the patented process, including the soap-borax over phosphate embodiment, because it commenced subsequent to the 1946 filing date of Henricks' original patent application (PB 104-105)."

The plaintiffs concede that the requested findings are not essential to the decision the Court has made. They base their request upon the fact that they were put to considerable expense and effort in rebutting an affirmative defense alleging that the plaintiffs were not entitled to a record date of invention of April 29, 1946, because the invention as published was not disclosed in the specifications filed in the original application; and further, that this was confirmed by Henricks in a statement on deposition, by his representation in the Canadian patent application and by the fact that prior to 1950 the invention was practiced by Standard Steel Spring.

They urge upon this Court that making the additional findings as requested will lay at rest the filing date to which the plaintiffs are entitled and the defense of Standard Steel Spring's practiced cold forming process as prior art. By so [5] doing, they reason, future judicial efforts would be conserved as well as the efforts of the parties.

After studying the file wrapper and those parts of the record essential to a proper determination of the issues raised by the requested additional findings, the Court is convinced that no judicial time would be saved nor would the efforts of counsel be conserved.

As the defendant points out in its brief, the Court based its opinion on the failure of the plaintiffs to show by a preponderance of the evidence that the accused processes duplicated the critical results achieved by the plaintiffs' invention. If the Court is correct in this conclusion, the date of invention is ir-

relevant. If, on the other hand, the date of invention ever becomes a decisive issue, careful consideration of all the facts will be required, and several critical points of law must be decided. The resolution of the issues raised by the requested additional findings of fact will be more difficult because so much has been written concerning this patent already.

[6] The Court has concluded that the interest of justice will be better served by deciding this issue only when and if it becomes essential to the ultimate termination of the litigation.

This aspect of the plaintiffs' motion for Additional Findings of Fact is therefore denied.

Submit order.

In the United States District Court
For The District of Delaware
FINAL JUDGMENT
Entered Januray 13, 1971;

This cause having been submitted to the Court for trial without a jury on the issue of patent infringement, and the Court having considered the pleadings, the decision of the Court of Appeals for the Seventh Circuit in *Devex, et al. v. General Motors, et al.*, 321 F.2d 234, 236-7 (1963), holding Claim 4 of Henricks patent No. Re. 24,017 valid, the stipulations of the parties, the Pretrial Order entered herein, the evidence received at the trial, and the briefs and arguments of counsel of the respective parties following trial, and the Court having rendered an Opinion and entered Findings of Fact and Conclusions of Law on September 8, 1970,

IT IS HEREBY ORDERED, ADJUDGED AND DECREED:

1. That defendant has not infringed Claim 4 of said Henricks patent No. Re. 24,017 by its 1955-1956 Pontiac bumper forming process using Bonderlube 246 (soap-15% borax) over a Bonderite IIIX phosphate coating, by its 1955-1956 valve lifter plunger forming process using Bonderlube 235 (soap-3% borax) over a Bonderite 181X phosphate coating, or by its 1952-1953 rocket forming process using Bonderlube 235 (soap-3% borax) over a Bonderite 180X phosphate coating.

[2] 2. That the Amended Complaint is dismissed with prejudice.

3. That defendant recover its taxable costs on the infringement issues in this action.

4. That the interlocutory order of February 3, 1967 of this Court decreeing that the decision of the Court of Appeals for the Seventh Circuit holding Henricks patent No. Re. 24,017 good and valid in law is binding on defendant and the law of the case, is hereby made final and a part of the Final Judgment.

/s/ Caleb M. Wright

United States District Judge

January 13, 1971

Approved as to form:

/s/ David F. Anderson

Attorney for Plaintiffs

/s/ Thomas S. Lodge

Attorney for Defendant

* * *

UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

Nos. 71-1344, 71-1345

DEVEX CORPORATION, TECHNOGRAPH, INC., WILLIAM C. McCOY, THEODORE A. Te GROTENHUIS, FREDERICK B. ZIESENHEIM, MARJORIE Te GROTENHUIS, WILLIAM C. McCOY, JR., and KATHERINE M. BASSETT,
Appellants in No. 71-1344

v.

GENERAL MOTORS CORPORATION,
Appellant in No. 71-1345

APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

Argued June 9, 1972

Before HASTIE, GIBBONS and M. ROSENN,
Circuit Judges

OPINION OF THE COURT

(Filed September 26, 1972)

HASTIE, *Circuit Judge.*

In the decision from which this appeal has been taken the District Court for the District of Delaware held, after full hearing on the merits, that a lubricating process used by General Motors Corporation, hereinafter "GM," to facilitate the fashioning of metal into automobile bumpers

and other manufactures did not infringe claim 4 of Reissue Patent No. 24,017, owned by Devex Corporation and hereinafter designed as the Henricks patent.[1]

Cold forming operations, with which this patent is concerned, involve pressing a workpiece, the metal to be deformed, against or between a die or dies so that it takes on a desired form. To accomplish "deep" or difficult draws of ferrous metal great pressure must be applied, and heat is generated by the relative movement under that pressure between the surface of the die and the surface of the workpiece. One of the problems of the art is the lubricating of these surfaces in such a way that galling and scratching the workpiece and defacing and otherwise damaging the die are avoided or minimized. It also is important that any substance that adheres to the workpiece after drawing be readily and inexpensively removable.

Claim 4 of the Henricks patent discloses a method of lubricating the workpiece by "forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating. . . ."

Specifications that were part of the Henricks patent application gave examples of the claimed process, including formulas for compositions of soap and borax that would serve as the film to be superimposed on the initial phosphate coating of the workpiece.

Devex originally filed the present suit against GM and a companion suit against Houdaille Industries, Inc., another alleged infringer, in the District Court for the Northern District of Illinois. The two cases were consolidated for the limited purpose of adjudicating the common

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1. Reissue Patent No. 24017 has now expired. Thus, while a court can award damages for infringement that occurred during the life of the patent, injunctive relief is no longer appropriate.

issue of the validity of Henricks claim 4. The court then proceeded to hold the patent invalid. On appeal, the Court of Appeals for the Seventh Circuit found claim 4 valid, though in a narrower context than its comprehensive language suggested, and remanded the cases for consideration of the issues of infringement. *Devex Corp. v. General Corp.*, 7th Cir. 1963, 321 F.2d 234.

At this point the courses of the suits against GM and Houdaille diverged. The suit against GM was removed to and decided by the District Court for the District of Delaware, and now is before us. The Houdaille case remained in the Northern District of Illinois where, on motion for summary judgment, the court decided that the defendant had infringed claim 4. On appeal that judgment was vacated and the cause remanded for full hearing on the merits. *Devex Corp. v. Houdaille Industries, Inc.*, 7th Cir. 1967, 382 F.2d 17. We are told that the claim against Houdaille was then settled.

The first Seventh Circuit appeal, contested by Devex and GM in this very suit, held, and the subsequent Houdaille appeal confirmed, that on its face claim 4 was merely a combination of old elements that were part of the prior art. However, the Court of Appeals considered and found valid the contention of Devex that, although its process was a combination of old and familiar elements, by superimposing a film of soap and borax over a phosphate coating as its above cited specifications taught, it had achieved unexpected and surprisingly favorable results that were different from what persons skilled in the art would have anticipated from this combination upon the basis of their knowledge and experience.[2]

More particularly, in the prior art phosphate coatings had proved harmfully abrasive when subjected to great

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2. It is familiar learning that in the combining of old and familiar elements the achievement of an unexpected result is needed and may suffice to make the combination patentable. *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Co.*,

pressure in drawing. And though adding a soapy film might be expected to lessen abrasiveness, in practice such a supplement had caused the deposit of a stubborn insoluble residue that was difficult to remove from the workpiece. These circumstances considered, the court found that, as claimed by the inventor,[3] the Henricks combination of a soap and borax film over a phosphate coating solved both of these problems by interacting under the pressure and resultant heat of drawing to form substances that minimized abrasion during the drawing and at the same time inhibiting the adherence of a stubborn water insoluble film to the workpiece.

GM contends that is followed the essential teaching of a familiar prior art "German process" rather than the Henricks process. The German process taught a presoaking of a phosphate coated workpiece for as long as fifteen hours in a soap solution until chemical reaction of the constituents formed a water insoluable soapy film. Henricks, the inventor who obtained the patent in suit and now is president of Devex, admitted in this case that a workpiece lubricated by the German process "drew beautifully." But it is conceded that the firm adherence of a residual water insoluble film to the workpiece after draw-

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Note 2—*Continued*

1950, 340 U.S. 147; *Griscom-Russell Co. v. Westinghouse Electric & Mfg. Co.*, 3d Cir. 1941, 121 F.2d 680.

The Court of Appeals for the Seventh Circuit stated the issue it considered and resolved in this case as follows:

> "Plaintiffs concede all of the elements which Henricks employed in claim 4 of the patent in suit were old per se or in other combinations and have been available in the art for some years. However, plaintiffs contend that the elements which Henricks selected were put together in a new way and achieved a new and unexpected result." *Devex Corp. v. General Motors Corp. supra*, 321 F.2d at 236.

3. In Example XIX, the Henricks patent application specifies a "Bumper Bar Forming Lubricant" that can be "readily cleaned off so that no defective nickel plating will be caused by any lubricant residues."

ing made the metal very difficult to clean. Indeed, Henricks testified that in some uses of the German process, "you can't remove it [the film] at all unless you burn it off in an annealing oven. . . ." In any event, "a serious defect in . . . [the German process] was that the residual deposit was not water soluble and presented a difficult cleaning problem especially if the workpiece was to be electroplated,"[4] as were the bumpers formed under lubrication by the accused GM process.

In sum, early phosphate coatings, even spongy phosphates that were soaked in wet lubricants before drawing, were unsatisfactory because of their abrasiveness. The German process minimized abrasion and galling and thus facilitated difficult drawing, but at the same time it created a serious problem of cleaning after drawing. Henricks disclosed a combination of soap and borax superimposed on phosphate that also provided satisfactory lubricity, indeed superior lubricity for drawing under extreme pressure and heat, without making the drawn metal difficult to clean. Because Henricks was able to achieve and maximize the familiar advantages of the elements he combined and at the same time to eliminate disadvantages that had hampered their earlier use, the Court of Appelas for the Seventh Circuit concluded that he had achieved an unexpected result that made his combination inventive and patentable.

The practice of GM in lubricating its metal for drawing into the shape desired for its manufactures certainly reads on Henricks. Admittedly, the phosphate coating differs in no significant way from Henricks. And the superimposed soap-borax film is precisely what Henricks taught. In his specifications Henricks suggested soap and borax in the proportions of as much as four or five parts of borax to one of soap. Testifying in this case he explained that borax in quantities varying according to the pressure required in particular drawing, served both to improve lubricity and to

4. *Devex Corp. v. General Motors Corp., supra*, 321 F.2d at 236.

emulsify the residue which otherwise would adhere to the workpiece as a hard to remove coating.[5] The district court found in this case, pursuant to the agreement of the parties incorporated in a pretrial order, that in forming bumpers GM used only fifteen percent borax with eighty-five percent soap. However, bumper forming is not an extremely high pressure drawing such as Henricks taught would require a lubricant with very high borax content.

Henricks did not teach and GM did not allow the waiting period of many hours between lubricating and drawing which characterized the German process and, according to the evidence, may have contributed significantly, the more so in the absence of borax, to the formation of an insoluble residue and its stubborn adherence to the workpiece.

It may well be that in developing his process Henricks was concerned primarily with devising a method of lubrication that would be effective in and could be adapted to drawings that were more difficult than the GM drawings involved in this case. But at most this means that the Henricks process could be adjusted to work satisfactorily over a wide range of drawing conditions. It does not warrant an inference that GM used some other process.

Despite the above described close correspondence of GM lubricating practice with the teaching of the Henricks patent, the district court concluded that infringement was not proved because Devex failed to establish that GM achieved the unexpected results that made the Henricks combination patentable. In our view the record does not warrant that factual conclusion.

The practical measure of lubricity is the effectiveness of the lubricating process in minimizing galling of the

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5. The Court of Appeals for the Seventh Circuit held that Henricks claim 4 was not made invalid for vagueness by the fact that it failed on its face to specify the proportions of soap and borax to be used. *Devex Corp. v. General Motors Corp.*, *supra*, 321 F.2d at 238.

surface workpiece and damage to the die during drawing. The record indicates that satisfactory lubricity, thus measured, was achieved both by the Henricks process and in the GM practice. Moreover, the German process, which GM purported to have used, was notably efficient in this regard, although tests indicated that the presence of borax, common to Henricks and GM but not taught by the German process, yielded even better lubricity at temperatures above 190°C.[6] And the depositions of GM technicians who observed or participated in the GM drawing also indicate that drawing was accomplished without serious galling or defacement of workpieces or dies. Accordingly, the district court properly found "that defendant's processes are effective, beneficial and an improvement over earlier solutions to their lubricating problems." 316 F.Supp. at 1378.

It follows that if, as GM claims, its practice did not achieve the essential and characterizing results that made the Henricks disclosure patentable, its shortcoming must have been a failure to achieve easy cleanability in conjunction with the satisfactory lubricity that it did achieve.

The most important single item we find in this long record on the issue of cleanability appears, with the express approval of the opposing parties, as an admitted fact in the

6. Friction between surfaces that slide while pressed together is the damaging circumstances that a lubricant must minimize by separating the adjacent surfaces. Temperature and pressure tend to cause lubricants to break down. Accordingly, the relative effectiveness of lubricants in a given environment of application is expressed by comparing their coefficients of friction in that environment. Tests introduced into this record showed that the presence of borax in lubricants for metal deforming operations was beneficial in environments hotter than 170°C. And from 190° upward borax in increasing amounts was essential to an adequate lowering of the coefficient of friction. The GM drawings created temperatures in excess of 190°. The tests showed that both the Henricks process and the GM practice, both of which used borax, lubricated even more effectively than the German process at temperatures in excess of 190°.

district court's detailed Pre-Trial Order. That order states categorically that GM experienced "no cleaning problem with either the accused process or with the lubricant "Mar-Proof," described merely as a "sticky oil," which GM used without an underlying phosphate coating before adopting the accused practice. However, the district court found that the accused practice created a "cleaning problem" because its use had to be followed by the same cleaning procedures that were used with Mar-Proof. But it is clear that, whatever the lubricant used, the workpiece requires cleaning after drawing. And when, as in the case of auto bumpers, the article is to be electroplated the surface must be most thoroughly cleaned. Since GM contends that it was using the German process, the relevant comparison here is between that process, which admittedly created a difficult cleaning problem, and the GM process which, consistent with Henricks, made possible a simple and easy cleaning of the drawn workpiece. Tests introduced into this record showed significantly easier cleaning of workpieces coated in the GM manner with a lubricant that contained borax than of workpieces coated with the German process lubricant that contained no borax.

Accordingly, neither the components of the GM lubricant, the manner in which that lubricant was used, nor the lubricity and cleanability achieved by the accused practice show any significant departure from the method of lubricating taught by Henricks or the results achieved by that method.

GM has attempted to avoid this conclusion by introducing expert testimony that the chemical interactions that occurred during drawing under the pressure and heat of the accused practice were different from those reported by Henricks in particular applications of his process. However, in evaluating this line of proof it must be kept in mind that Henricks claimed a method of lubricating a metal workpiece that yielded in drawing an unexpectedly favorable conjunction of lubricity and cleanability. He did not

claim any patentable discovery of a chemical reaction or compound. Indeed, it was not essential to the patentability of the Henricks combination that he describe or even understand any chemical reactions that made it work better than other lubricating methods.[7] In brief, a showing that like or different chemical reactions occur in the course of drawings utilizing allegedly different lubricating methods may suggest inferentially that the results yielded by the methods are or are not equivalent. But if it is directly determinable that the two lubricants have essentially the same components, are applied in the same way and that the results of their use are essentially the same, the disputation of chemists about the chemical interactions that occurred in the processes cannot be decisive.

Moreover, it may well be that chemical reactions differed in degree, and perhaps in kind as well, in different applications of the Henricks process. Claim 4, even as restricted and held valid in the Seventh Circuit, covers and protects the combination of soap and borax in proportions to be varied according to the nature and difficulty of the draw to be facilitated so that the process will yield its claimed advantages over a wide range of drawing pressures and temperatures. It is not claimed that in every Henricks mix under every temperature, chemical reaction and its products will be identical. Thus, if one accepts as persuasive the testimony of GM experts that reactions and substances produced during the GM drawings were not identical with those that the Henricks process is said to have produced using different proportions of ingredients under different pressures at different temperatures, it does not follow that GM practice failed to produce the results that made the Henricks process patentable.

In these circumstances, the demonstrated effectiveness of GM practice in producing the satisfactory drawing

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7. *Diamond Rubber Co. v. Consolidated Tire Co.* (1911), 220 U.S. 428; *Crozier-Straub, Inc. v. Graham*, 3d Cir. 1928, 28 F.2d 321.

and ease of cleaning that Henricks had achieved must prevail over any contrary inference drawn from disputed expert testimony as to comparative chemistry in what may well not have been equivalent situations.

By its cross appeal GM challenges that part of the judgment of the district court which held that the decision of the Court of Appeals for the Seventh Circuit, sustaining the Henricks patent as valid in a stated limited context, was binding upon GM. The legal basis of this challenge is a contention that venue was lacking in the Northern District of Illinois where suit was instituted. The court below held that GM had waived its objection to venue. For the reasons fully and clearly stated in the district court's opinion, *Devex Corp. v. General Motors Corp.*, D.Del. 1967, 263 F.Supp. 17, we sustain that holding.

The judgment will be reversed.

UNITED STATES COURT OF APPEALS

FOR THE THIRD CIRCUIT

Nos. 71-1344 and 71-1345

DEVEX CORPORATION, TECHNOGRAPH, INC., WILLIAM C. McCOY, THEODORE A. TEGROTENHUIS, FREDERICK B. ZIESENHEIM, MARJORIE TEGROTENHUIS, WILLIAM C. McCOY, JR., AND KATHERINE M. BASSETT,

Appellants in No. 71-1344

vs.

GENERAL MOTORS CORPORATION,

Appellant in No. 71-1345

(D.C. Civil Action No. 3058)
ON APPEAL FROM THE
UNITED STATES DISTRICT COURT FOR THE
... DISTRICT OF DELAWARE

Present: Hastie, Gibbons and Rosenn, Circuit Judges

JUDGMENT

This cause came on to be heard on the record from the United States District Court for the ... District of Delaware and was argued by counsel.

On consideraton whereof, it is now here ordered and adjudged by this Court that the judgment of the said District Court, filed January 13, 1971, be, and the same is hereby

reversed as to that portion of the said judgment which held that the defendant had not infringed Claim 4 of Reissue Patent No. 24,017, which holding is the subject of the principal appeal herein at our No. 71-1344; as to that portion of the said judgment which held that the decision of the Court of Appeals for the Seventh Circuit, sustaining the Hendricks patent as valid in a stated limited context, was binding upon GM, it is further ordered that said portion of said judgment be and hereby is affirmed, all in accordance with the opinion of this Court. Costs taxed in favor of appellants in No. 71-1344 and in favor of appellee in No. 71-1345.

ATTEST:

THOMAS F. QUINN
Clerk

September 26, 1972

UNITED STATES COURT OF APPEALS

FOR THE THIRD CIRCUIT

Nos. 71-1344 and 71-1345

DEVEX CORPORATION, TECHNOGRAPH, INC., WILLIAM C. McCOY, THEODORE A. TeGROTENHUIS, FREDERICK B. ZIESENHEIM, MARJORIE TE GROTENHUIS, WILLIAM C. McCOY, JR., AND KATHERINE M. BASSETT,

vs.

GENERAL MOTORS CORPORATION,

Appellant.

SUR PETITION FOR REHEARING

Present: Seitz, *Chief Judge;* and Hastie, Aldisert, Gibbons *and* M. Rosenn, *Circuit Judges.*

The petition for rehearing filed by GENERAL MOTORS CORPORATION, *Appellant,* in the above entitled case having been submitted to the judges who participated in the decision of this court and to all other available circuit judges of the circuit in regular active service, and no judge who concurred in the decision having asked for rehearing, and a majority of the circuit judges of the circuit in regular active service not having voted for rehearing by the court in banc, the petition for rehearing is denied.

By the Court,

COLLINS J. SEITZ
Chief Judge

Dated: November 29, 1972

SUPREME COURT OF THE UNITED STATES
OFFICE OF THE CLERK
WASHINGTON, D.C. 20543

May 7, 1973

J. Pierre Kolisch, Esq.
Kolisch, Hartwell & Dickinson
1004 Standard Plaza
Portland, Ore. 97204

RE: Salem Eqpt., Inc., et al. v. Kockum Industries, Inc., 72-951; O.M. Scott & Sons Co. v. Noll and Fortunato, Trustees, 72-1127; *General Motors Corp. v. Devex Corporation, et al., 72-1161.*

Dear Sir:

The Court today entered the following order in the above-entitled cases:

72-951 — The petition for a writ of certiorari is denied.
72-1127 — The petition for a writ of certiorari is denied.
1161 — The petition for a writ of certiorari is denied. Mr. Justice Powell took no part in the consideration or decision of this petition.

cc: John D. Nies, Esq.
George N. Hibben, Esq.
Richard W. Seed, Esq.
Stanley L. Amberg, Esq.
Walter J. Blenko, Esq.

Very truly yours,

MICHAEL RODAK, JR., Clerk
By

/s/ Helen Taylor, (Mrs.)
Assist. nt Clerk

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

DEVEX CORPORATION, ET AL.
Plaintiffs,

v.

GENERAL MOTORS CORPORATION
Defendant.

Civil Action
No. 3058

REPORT OF SPECIAL MASTER PURSUANT TO F.R.C.P. 53(e)

February 7, 1980

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I. PROCEDURAL BACKGROUND

A. History of the Case

In late 1956 and in 1957, plaintiffs filed lawsuits against General Motors Corporation and Houdaille Industries, Inc., respectively, in the United States District Court for the Northern District of Illinois, claiming in both actions that defendants had infringed Claim 4 of the Henricks Reissue Patent No. 24,017. The patent had been reissued on June 7, 1955, on Original Patent No. 2,588,234 dated March 4, 1952, as the result of an application filed October 31, 1950. The patent expired on March 4, 1969 (Princ. Doc.,* Tab 1, p. 1; Plaintiffs' Br. on Acctg., p. 1; Defendant's Br., p. I-16; APTO,** App. I, p. 2).

The Houdaille and General Motors actions were thereafter consolidated (382 F.2d at 19). Following trial, by opinion dated February 1, 1962, implemented by a final judgment entered June 29, 1962, Claim 4 was held by the District Court (through District Judge Edwin A. Robson) to be invalid and void (Princ. Doc., Tab 2).

From the finding of invalidity, plaintiffs appealed. The Court of Appeals reversed, *Devex Corporation, et al. v. General Motors Corporation, et al.*, 321 F.2d 234 (7th Cir. 1963), *cert. den.*, 375 U.S. 971 (1964), adjudicating the validity of Claim 4 of the Henricks patent.

After remand plaintiffs' action against General Motors was transferred to the District of Delaware. *Devex Corporation v. General Motors Corporation*, 146 U.S.P.Q. 346 (N.D. Ill. 1965). Houdaille Industries remained as a defendant in the

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* The reference is to a booklet entitled "Principal Documents on Accounting" put together by defendant, and filed with plaintiffs' concurrence.

** "APTO" refers to the Pretrial Order on Accounting.

Chicago case (263 F.Supp. at 20). After discovery both sides in the Houdaille case moved for summary judgment on the issue of infringement. Plaintiffs prevailed. *Devex Corporation, et al. v. Houdaille Industries, Inc.*, 148 U.S.P.Q. 74 (1965). The Court of Appeals again reversed, *Devex Corporation v. Houdaille Industries, Inc.*, 382 F.2d 17 (7th Cir. 1967), concluding that summary judgment was inappropriate. Later the Devex-Houdaille controversies were resolved by settlement (467 F.2d at 258).

Meantime, the Devex action against General Motors was transferred to the District of Delaware and assigned to then Chief (now Senior) Judge Caleb M. Wright. Plaintiffs moved for summary judgment. In opposition to the motion General Motors advanced a finely spun venue theory toward the proposition that it was not bound by the validity holding of the Seventh Circuit in the Houdaille case. Rejecting this argument, the Court held that the Seventh Circuit's holding of the validity of Claim 4 of the Henricks Reissue patent bound General Motors. But, on the infringement question, the Court (differing from the shortly-thereafter-reversed approach of the Chicago District Court) held summary judgment to be inappropriate. *Devex Corporation, et al. v. General Motors Corporation*, 263 F.Supp. 17 (D. Del. 1967).

Validity having been resolved, and infringement not being susceptible of summary disposition, a trial on the infringement issue was held before Judge Wright. The result was a determination that defendant had not infringed the Henricks patent.* *Devex Corporation v. General Motors Corporation*,

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* Pre-trial skirmishes gave birth to two additional reported decisions: *Devex Corporation, et al. v. General Motors Corporation*, 275 F.Supp. 310 (D. Del. 1967), sustaining defendant's objections to plaintiffs' overbroad interrogatories, and *Devex Corporatoin, et al. v. General Motors Corporation*, 285 F. Supp. 109 (D. Del. 1968), granting plaintiffs' motion to amend their complaint so as to assert the doctrine of equivalents.

316 F.Supp. 1376 (D. Del. 1970). Plaintiffs appealed. And the Court of Appeals reversed, concluding that the District Court had erred as a matter of law in failing to find that defendant had infringed the patent in suit. *Devex Corporation, et al. v. General Motors Corporation*, 467 F.2d 257 (3d Cir. 1972), *cert. den.*, 411 U.S. 973 (1973).

On remand, on March 15, 1974 Judge Wright appointed the undersigned as special master to resolve the issues remaining between the parties in the accounting phase of the litigation. Discovery proceeded, and included dozens of depositions, hundreds of interrogatories and answers, and thousands of pages of document production. Where controversies developed between the parties, they were resolved by the special master.*

The trial began October 30, 1978, and concluded February 14, 1979. It consumed fifty-three trial days, and generated hundreds of exhibits. The last brief, filed in accordance with a schedule settled between the parties, was submitted August 15, 1979. Oral argument was held November 14, 1979.

And, seminally, this is the special master's Report.**

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* In the years since the order of reference, none of the special master's decisions have been appealed. Hence, the Court will be looking at all aspects of the accounting phase of the case with a fresh eye when it reviews this Report.

** If there is a sigh in this sentence, it stems from the reminder of mortality which the long duration of this controversy has produced. On February 4, 1977, George Hibbens, Esquire, one of defendant's counsel, passed away. Walter Blenko, Esquire, a principal advocate for plaintiffs, expired in November, 1978. Although both sides continued to be represented by counsel of the highest quality, the loss of these singularly able, and gentlemanly lawyers, caused sadness to all involved in the case.

B. Design of the Decision

The character of the controversies here is such that to restrict the exposition of the decision-making process to numbered paragraphs would be to leave it choppy and disjointed. I have, therefore, elected to frame the decision in narrative form, *cf. Ass'n of Westinghouse Employees v. Westinghouse Corp.*, 283 F.2d 93 (3d Cir. 1960), hoping that this style will make for a smoother, and therefore, more understandable flow.

Style to one side, my aim has been to produce a decision which is understandable, subject to meaningful review, and therefore likely to advance the final denouement of this twenty-odd year old judicial drama. Toward that purpose a strong effort has been made to fairly come to grips with the major contentions advanced by each side. The record is heavy. The parties' post-trial presentations by themselves consist of perhaps a thousand pages of briefs, proposed findings, comments, and computations. While I have not explicitly dealt with each of the very large number of contentions made by the parties, most have been treated with in the decision and none has been ignored in the deliberations leading to it.

II. INFRINGEMENT

A. Law of the Case

1. It is the Law of the Case that Each of the Three Prior Trial Practices Infringe

Plaintiffs accuse sixty-one separate practices which were employed at various of General Motors, divisions as infringing the patent in suit. Three of these practices were *sub judice* before Judge Wright, and later before the Court of Appeals for the Third Circuit in the earlier infringement cases. What the Third Circuit decided provides controlling guidance on

the infringement question here. Not atypically the parties are at odds on the Third Circuit's adjudication.

The background of the "law of the case" controversy may be described in this way. Claim 4 of the Henricks patent teaches a process for the lubrication of metals before cold forming, and covers:

> "The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising of solid meltable organic binding material containing distributed therethrough a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal." (Princ. Doc., Tab 1, p. 18.)

The "organic binding material" contemplated by the patent is soap. The "inorganic compound" is borax, or some other inorganic substance meeting the patent's claims and performing the same function as does the borax.

In holding the patent invalid, Judge Robson adverted to the indefiniteness of Claim 4 in that it did not specify " . . . the amounts and proportions of the compounds . . ." (Princ. Doc., Tab 2, p. 260). One of the lubricants before Judge Robson was Bonderlube ("BL") 235, a material produced by a company then known as Parker Rustproof Company. BL 235 is described by Judge Robson as containing about three per cent borax (*Id.*, p. 221).

The Seventh Circuit, in reversing Judge Robson and validating the patent, held the absence of quantitative borax-content measures not to be fatal. *Devex Corporation v. General Motors Corporation*, 321 F.2d 234 (7th Cir. 1963). It

reached this conclusion although the BL 235 lubricant had a much smaller borax content (three per cent) than was suggested by Example XIX (at least fifty-eight per cent borax and boric acid), and Example XX (eighty-five per cent borax) found at column 15 of the patent (Princ. Doc., Tab 1, p. 15).

When the General Motors case was transferred from Illinois to Delaware for trial on the infringement issue, three accused practices or processes were presented to Judge Wright (APTO, App. I, p. 26). The first was used by Pontiac for the formation of bumpers, and involved the use of phosphate over Parker's BL 246, a lubricant with a fifteen per cent borax content. The other two processes entailed the use of BL 235 (described as containing three per cent borax as Judge Robson had earlier noted, along with two per cent sodium nitrite and ninety-five per cent soap), and were employed in the making of valve lifter plungers at defendant's Diesel Equipment Division and the making of rocket parts at Pontiac (316 F.Supp. at 1380-1383). Judge Wright held that none of the three processess infringed (316 F.Supp. at 1390). The Court of Appeals reversed (467 F.2d 257).

In its opinion the Third Circuit devoted specific attention to the accused Pontiac BL 246 process. Defendant urges that the reversal was restricted to that process, and that Judge Wright's non-infrigement findings as to the two BL 235 practices were either left undisturbed, or that it was the intent of the Third Circuit to keep the slate clean for fresh consideration on remand as to the BL 235 practices. Plaintiffs argue that all three practices were before the District Court, and came before the Court of Appeals by their appeal of the judgment below.

Thus is the issue joined. While only one of many issues between the parties, it is the first because its disposition will provide controlling guidance as to whether the many other BL 235 (and like-BL 235) processes accused here infringe.

I conclude that plaintiffs are correct, and that the Court of Appeals did adjudicate the infringement of the prior trial BL 235 processes. Most simply put, the Third Circuit had before it a judgment which contained a finding of non-infringement as to all three processes, and held "The judgment will be reversed" (467 F.2d at 262). What was regarded by the trial court to be non-infringing was therefore held by the Third Circuit to be infringing.

Nothing in the Third Circuit's decision implies that the Court wished to regard the BL 235 processes separately or differently from BL 246 which undisputedly was found to be infringing. For example, no distinctions between the two lubricants are drawn by the decision, such as would support the view that as to one the Court intended to reverse and as to the other it did not. Further, while mainly discussing BL 246, the Opinion in its very first sentence refers to the District Court's holding as involving a process used by General Motors to facilitate "... the fashioning of metal into automobile bumpers *and other manufacturers.*" (Emphasis added. 467 F.2d at 257-258.) The only "other manufactures" before the Court of Appeals were the two BL 235 processes.

While the discussion could stop at this point, the importance of the issue and the argumentative energy which defendant has devoted to it have impelled a closer look at the appellate papers to assure that they are consistent with what appears to be clear adjudicating language in the Court of Appeals Opinion. They are.

In its brief on appeal to the Third Circuit, defendant repeatedly made reference to the BL 235 process. See *e.g.*, General Motors brief at pages 11, 28, 31, and 34. Indeed, a reading of defendant's brief inspires a sense of deja' vu, since defendant advanced in the Court of Appeals the same contentions which it repeats now toward the point that its BL 235 processes did not infringe.

Following the Third Circuit's decisions, defendant filed a petition for rehearing. One cannot read that petition without acquiring the conviction that defendant itself *knew* the decision applied to both the BL 246 and BL 235 processes. Both are explicitly referred to in the petition (see, *e.g.*, Pet. For Reh., pp. 4, 5, 6). And, tellingly, defendant, for reasons best known to it, did not urge the Court to change, or as defendant would suggest "clarify", its decision to make it apply only to the BL 246 process. To the contrary, cleaning tests on BL 235 samples were described, and defendant only urged the Court to give the tests of defendant's witnesses "greater consideration" (*Id.*, p. 5). The Court was invited to recognize (as am I) that the "no cleaning problem" provision in the pretrial order cited in the opinion as "[t]he most important single item" (467 F.2d at 261) related to the Bl 246 process and not the Bl 235 process (Pet. for Reh., p. 6). The Court of Appeals declined to in any way adjust its decision in response to defendant's imprecations.

In its petition for certiorari to the United States Supreme Court defendant made no distinction between the BL 246 process which it concedes the Third Circuit intended to hold as infringing, and the BL 235 processes which it now says were left open by the Court of Appeals' decision. Again the petition dealt with all three processes. After describing the District Court's findings with respect to the BL 235 and BL 246 accused practices (Pet. for cert., p. 8, particularly fn. 23), defendant characterized the holding of the Court of Appeals thusly:

> "In effect, the Third Circuit ruled that where a process patent is given limited validity by a holding based solely on coaction not described in the claim, and to which the claim is not limited, the patentee may nevertheless enforce its patent monopoly against other processes within the claim's unspecific language, even where such coaction has not been shown to occur." *Id.*, p. 10.

The "other processes", as to which the Third Circuit is suggested to have erroneously ruled, appear from the context of the petition for certiorari to be the accused BL 235 processes as well as the BL 246 process. Nowhere in its petition did defendant suggest that the only process passed on by the Court of Appeals, and therefore subject to review by the Supreme Court, was the BL 246 process.

Finally defendant did not apply for a special form of mandate separating out the BL 235 uses from the BL 246 practice, as was its right (FRAP 36, 41). The mandate as actually entered " . . . reversed as to that portion of the said [District Court] judgment which held that the defendant had not infringed Claim 4 of the Reissue Patent No. 24,017, which holding is the subject of the principal appeal herein . . . "

That defendant should not have moved for a special form of mandate is consistent with what seems to me to be its clear recognition that the Court of Appeals intended to hold all three processes before it as infringing. The mandate as entered puts the final nail in the coffin of defendant's law-of-the-case argument.

But, argues defendant, there are nevertheless differences between the characteristics of BL 235 and BL 246 which can be taken into account now to hold the latter non-infringing even though the Court of Appeals may have concluded otherwise. I do not find that the cases on which defendant relies support that conclusion.

Imperial Chemical Industries v. National Distillers and Chemical Corp., 354 F.2d 459 (2d Cir. 1965), is cited by defendant as "especially in point" toward the proposition that there remains latitude to argue that the BL 235 prior trial practice did not and does not infringe. In *ICI*, a trade secret case, the trial court originally denied plaintiff a preliminary injunction, and the Court of Appeals reversed and remanded.

See 342 F.2d 737 (2d Cir. 1965). On remand interlocutory relief was again refused, this time because the trial court corrected a finding which it had made prior to the first appeal. Again plaintiff appealed. This time the Second Circuit declined to reverse, and in so doing, it emphasized two factors which are not present here. First, in *ICI* the trial court itself found it had been in error and corrected the error. In the case at bar the Court of Appeals found the trial court in error, and by its mandate of reversal the Court of Appeals corrected the lower court's error. What defendant seeks in this case is for me to in effect find the Third Circuit in error and reinstate Judge Wright's findings. Neither *ICI* nor any other authority permits that result. Second, in *ICI* the trial court's findings were themselves only tentative because " . . . the findings of fact made upon the motion for preliminary injunction are not controlling . . ." (354 F.2d at 463). See also, 1B *Moore's Federal Practice*, ¶ 404[10], p. 572. Here, in contrast, the prior trial accused practices were *sub judice* before the Third Circuit on appeal from definitive *post-trial* findings upon which a final judgment on the infringement issue rested. The Court of Appeals' judgment, as to which certiorari was sought and denied, was final with respect to all findings and conclusions which were before the Court.

Defendant also relies upon *Aro Manufacturing Co., Inc. v. Convertible Top Replacement Co., Inc.*, 377 U.S. 476 (1964), which affirmed in part and reversed in part a decision at 312 F.2d 52 (1st Cir. 1952). An earlier installment of the *Aro* litigation ("*Aro* I") (365 U.S. 336 (1961), *reh. den.*, 365 U.S. 890 (1961)) had resulted in a holding that replacement fabric auto convertible tops sold for use on vehicles manufactured by General Motors, a licensee under the patent in suit, were permissible "repair". The Supreme Court concluded that by purchasing and furnishing the replacement fabric, GM customers and the manufacturer, respectively, were not direct or contributory infringers. In a subsequent *Aro* case

("*Aro* II"), the District Court interpreted the earlier Supreme Court decision to mean that replacement fabrics for vehicles produced by an unlicensed manufacturer (Ford) were similarly immune from claim by the patentee. The Court of Appeals concluded that the Supreme Court had intended its exculpatory decision to apply only to vehicles which were manufactured under license (312 F.2d 52). On certiorari the Supreme Court agreed (377 U.S. 476). Both *Aro* II opinions carefully review the logic and language of the *Aro* I decision, leaving no doubt that the Supreme Court had intended to limit that decision. Here, by contrast, logic and analysis compel the conclusion that the Third Circuit did not intend to limit its decision, but rather intended its reversal to apply to all three alleged infringements which had been placed before it for review.

Defendant also adverts to *Standard Oil Company of California v. United States,* 429 U.S. 17 (1976). That case held that the district court had the power to open a judgment under F.R.C.P. 60(b) without seeking leave of the appellate court which affirmed it. Neither the holding, nor the brief discussion which supports it, have the slightest connection with the law-of-the-case issue here.

The other cases cited, but not much discussed by defendant are similarly unpersuasive.

The governing law-of-the-case principle is (quoting from *Re Sanford Ford & Tool Co.,* 160 U.S. 247, 255) as announced in *In re Potts,* 166 U.S. 263, 266 (1897):

> "When a case has been once decided by this court on appeal, and remanded to the circuit court, whatever was before this court, and disposed of by its decree, is considered as finally settled. The circuit court is bound by the decree as the law of the case; and must carry it into execution according to

> the mandate. That court cannot vary it, or examine it, for any other purpose than execution; or give any other or further relief; or review it, even for apparent error, upon any matter decided on appeal; or intermeddle with it further than to settle so much as has been remanded. . . ."

The task on remand is to play the ball as it lies. There can be no rolling over to give one side or the other a better shot. Here that means acceptance by me as master of the no-longer-disputable premise that the prior trial accused processes using BL 235 as well as BL 246 are infringing. It follows as a matter of law that any other accused practices which operate in substantially the same way as those prior trial practices, and which produce substantially the same results must also be found to infringe. *Flat Slab Patents Co. v. Turner*, 285 F. 257, 273 (8th Cir. 1922). See, dealing with the analogously applicable doctrine of equivalents, *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 608 (1950).

2. It is the Law of the Case that Cleanability in a Routine, Commercially Acceptable Way Satisfies the "Cleanability" Requirement of the Patent

The decisions touching the patent require that the user achieve "easy cleanability". For the reasons which follow, I find that this requirement is satisfied by any accused process which permits cleaning to be done in a routine, commercially acceptable way.

In its second review of the Henricks patent in the *Houdaille* case, *Devex Corporation v. Houdaille Industries, Inc.*, 382 F.2d 17 (7th Cir. 1967), the Seventh Circuit made it plain that plaintiffs could not prove infringement based solely upon a literal reading of Claim 4 of the patent. They had to prove, in addition, that by following the Henricks' teaching a "new and

unexpected result" ensued (383 F.2d at 23). But for this requirement, the Court strongly implied, the patent would not have survived attack since " . . . such a [literal] construction would monopolize the whole broad field of metal forming with any use of dry soap and borax over phosphate at any temperature or pressure, regardless of results." (*Ibid.*)

Following the decision of the Seventh Circuit, Judge Wright found that the BL 235 and BL 246 processes literally tracked the teachings of Claim 4, but held that they did not infringe because they did not achieve the new and unexpected results promised by the patent as construed. In reversing, the Third Circuit swept aside arguments as to *how* the results were achieved, and held that it was sufficient for plaintiff to prove that the accused process achieved "easy cleanability" in conjunction with "satisfactory lubricity" (467 F.2d at 261).*

The Third Circuit in its decision further illuminated the cleanability requirement by referring to a "no cleaning problem" stipulation as meeting the requirement in BL 246 Pontiac bumper practice. The stipulation was a part of the pretrial order in the infringement case (APTO, App. I, p. 10). Defendant has sought to limit it, believing that without the stipulation it would have been exonerated of infringement.

But I think the "no cleaning problem" stipulation gave away nothing. For what the stipulation meant, and what it

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* *Eutectic Corp. v. Metco, Inc.*, 579 F.2d 1 (2d Cir. 1978), involved patents for a flame spray device designed to cause a self-bonding coat to be affixed to metal surfaces. Citing the Third Circuit's *Devex* decision, the Court held it of no legal consequence that the reactions giving rise to the desired results were even different from those the patentee had reported.

was taken to mean, is that metal coated in the way taught by the patent could be cleaned in a routine, commercially acceptable way.

The record of the prior trial made it crystal clear that Pontiac bumpers required multi-step post-forming preparation prior to electroplating. See, *e.g.*, the cleaning procedures described in Judge Wright's decision (316 F.Supp. at 1381). The Court of Appeals was not ignorant of this. The clear purport of the Court of Appeals' ruling is that the need for cleaning did not vitiate the application of the patent. To the contrary, it vitalized the patent so long as the cleaning could be done in the regular course of production.

This conclusion is consistent with (what I have found to be) the Third Circuit's holding that BL 235 processes also infringed. The prior trial valve lift plungers were cleaned after forming in a drum washer with a mild acid spray for 2-3 minutes (316 F.Supp. at 1382) and the rocket parts were cleaned in a strong alkaline cleaner (316 F.Supp. at 1389). Again it was enough that cleaning could be accomplished in a commercially routine way.

While finding it to be the law of the case that it is enough to prove commercial cleanability (as in the prior trial bumper use of BL 246 and non-bumper lubrication with BL 235) the cleanability point should not be left without giving recognition to an argument which the defendant has strongly, and not unpersuasively, urged. Defendant's argument can be stated thusly: In sustaining the validity of the patent, the Seventh Circuit found it advantageous, cleanability-wise, by comparing the patent with the so-called "German process" which involved a coating of soap-only over borax over the workpiece accompanied by a long soaking period. It found that the German process had a "serious defect in . . . that the residual deposit was not water soluble and presented a difficult cleaning problem especially if the workpiece was to be

electroplated" (321 F.2d at 236). The Seventh Circuit relied upon plaintiffs' argument that the "difficult cleaning problem" was ameliorated because the patented process formed "amorphous glassy materials" and with the further result that "the formation of insoluble organic materials is inhibited and there is no cleaning problem" (*Id.* at 236-237). The Seventh Circuit emphasized this unexpected result in its opinion in the second *Devex* case (382 F.2d at 22-23).

Defendant urges that in fact the selfsame water insoluble substance produced by the German process is produced by the accused BL 235-type processes. It submits that its items of manufacture, particularly those produced by processes like the prior trial BL 235 processes, are neither less nor more difficult to clean than was the case under the German process. It urges that plaintiffs have failed to prove that the accused borax-containing lubricants create more cleaning difficulties than would have been the case were the borax omitted. Defendant concludes, therefore, that these processes cannot be held to infringe.

This is not a frivolous argument. It was evidently persuasive to Judge Wright, whose decision finding non-infringement cited evidence showing that zinc stearate (the difficult-to-clean substance deposited by the German process) also appeared when defendant practiced the accused patented processes. *E.g.*, Findings 12(a), (c), (d), (e), (f), (g), (h), (i), (j), (l), and 13 (316 F.Supp. at 1386-1389). And the argument was again ably made to the Third Circuit in defendant's effort to secure an affirmance of the District Court's non-infringement findings. Indeed, an examination of its brief on appeal and its motion for reargument makes it plain that the bulk of defendant's presentation on review was devoted to the proposition that plaintiffs had not shown that the patented process resulted in a cold-formed piece easier to clean that would have resulted under the pre-patent German process.

Were I writing on a clean slate I might (or might not) reach the same conclusion as did Judge Wright. But I am not. The Third Circuit has adjudicated (as I have found) that the prior trial BL 246 and BL 235 processes infringe. By so finding, it can only have intended to compare the success of the routine ("simple and easy") commercial cleaning steps used in the prior GM trial practices with the "difficult cleaning problem" postulated as the principal vice of the German process. It is that comparison which the Court found was "[t]he relevant comparison" (467 F.2d at 261).

To go at it a different way, defendant argued long and hard to the Third Circuit that Judge Wright was correct in holding that the prior trial practices (the BL 235 *and* BL 246 processes) produced the same water insoluble zinc stearate formed in the German process. (*E.g.*, Defendant's Brief to the Third Circuit, pp. 30-32). The Court of Appeals found it unneccessary to assay the chemical correctness of defendant's contention. Rather it emphasized that the accused practices accomplished the needed cleaning job with no problem, which I take to mean in a routine, commercial way. If it is assumed that the German process could not be cleaned except with extraordinary effort, the logic of this approach is self-evident.

But logical or not, the zinc stearate battle fought before Judge Wright and in the Third Circuit is now over. The special master's marching orders are to find as infringing those practices which (in addition to the other patent requirements) have the same routine, commercial cleanability characteristics as the prior trial practices. And that is the approach which will be followed.

3. It is the Law of the Case that Lubricity Sufficient to Achieve Effective Production Satisfies the "Satisfactory Lubricity" Requirement of the Patent

In addition to routine, commercial cleanability, the decisions touching the patent require that the user achieve "satisfactory lubricity" (*e.g.*, 467 F.2d at 261).

At the trial of this cause the parties devoted a very large amount of energy toward laboratory proofs of the effect of borax and other inorganic substances on lubricity. Plaintiffs offered as an expert Professor Ernest Rabinowicz, of the Massachusetts Institute of Technology, toward the point that in pin-on-metal tests the addition of borax and equivalents tended to reduce the coefficient of friction of the steel to which it was applied. Defendant supplied Professor Kenneth Ludema, of the University of Michigan, whose laboratory tests, using a somewhat different pin-on metal device, generated results diverging by a large degree from those reached by Dr. Rabinowicz.

Predictably, each side probes the tests of the other in an effort to expose the errors which led to what it sees as mistaken conclusions. Plaintiffs assail the alleged inexperience of defendant's personnel in preparing test samples, Dr. Ludema's supposed failure to have checked his results for internal consistency or drift, the manner in which the cantilever was attached to the Ludema machine, the manner in which Ludema accounted for the stick-slip phenomenon, and out-of-control results statistically arguable as to some of Dr. Ludema's tests. For its part, defendant attacks the Rabinowicz friction machine, the top limit of 252° C. reached by plaintiffs' tests, the many allegedly subjective adjustments Dr. Rabinowicz felt himself obliged to make to his test results, the supposed lack of repeatability of the Rabinowicz results,

the fact that the Rabinowicz tests were made with foreknowledge of what was being tested rather than in the blind, etc.

While the record does permit a decision on the question of which set of lubricants was more slippery in the pin-on-metal tests, in the context of the controversies here that is an unnecessary exercise.* For if arguments among chemists were thought by the Court of Appeals to be unimportant in the cleanability context (467 F.2d at 261), they are of even less use in resolving the issue of whether the accused practices achieve satisfactory lubricity.

Judge Wright found from the record as a whole in the prior infringement trial that " . . . defendant's processes are effective, beneficial and an improvement over earlier solutions to their lubricating problems . . ." (316 F.Supp. at 1378). The Court of Appeals observed that the record supported ("properly found") this conclusion (467 F.2d at 260).

The central inquiry here is not which expert in the antiseptic environment of a laboratory would be most likely to accurately predict whether a particular lubricant will or will not achieve satisfactory lubricity. Lubrication tests in a

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* In other phases of the case findings are made although not strictly necessary to the conclusion reached so as to try to make a record which will avoid the need for remand if there is found to be error in any particular. In the matter of the lubricity tests I should say that I am not in doubt as to which of the two experts, by reason of experience and the reasoning underlying his views, I would trust were I to embark on a commercial venture in which laboratory information as to the slipperiness of metal variously coated. But although a choice could be made between the experts as to which set of tests to credit, it is clear that each was sincere and forthcoming, and believed in the reliability of his experiments. Under such circumstances it seems to me a gratuitously hurtful exercise to resolve what I have concluded to be an immaterial controversy.

laboratory are at best an imperfect barometer of what production experience is likely to show. It is how the lubricant works in the production process that is the true test.* I find that borax-containing lubricants would not have been used in actual production if defendant did not believe they worked satisfactorily.

Respecting this conclusion, defendant's references to instances in which borax-containing lubricants did *not* work are of interest:

> "Pontiac tried Pennsalt Drawcote 1044 on its production equipment. Tr 5018 (Herrmann); Def. Ex. A-28-2. This lubricant contained 74 percent borax and 25 percent sodium tallow soap. Def. Ex. A-25, Pennsalt tab, p. 3. The work so lubricated was broken in the test, and Pontiac did not use such lubricant in production. Def. Proposed Finding Tr D-5.
>
> "A decade later, Pontiac had trouble with Great Lakes Steel lubricated by Production Finishing with

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* At oral argument, defendant's counsel stated: "As I read the Court of Appeals decision at least, it seems to me that the Court is saying that if you use it and don't have troubles, that is satisfactory lubricity." (Tr., p. 68 of oral argument held November 14, 1979.)

Plaintiffs put it most succinctly in their brief to the Third Circuit: "The practical man in the shop doesn't care about theories, he looks to results." (DX A-22, Third Cir. Br., p. 19.) Defendant, after making its criticisms of the Rabinowicz tests, made the point " . . . that none of the laboratory tests can do more than confirm production experience and provide some indication of why production observations occurred." (Defendant's Comments on Plaintiffs' Proposed Fact Findings 75-110, p. 28.) Both sides appear to agree that coefficient of friction, which was all the laboratory tests were designed to measure, is not necessarily controlling in lubrication selection (Wojtowicz, Tr. 5723; Herrmann, Tr. 5018).

> Bruko D-122 (PF888), then 50 percent borax, 45 percent sodium tallow soap. Def. Ex. A-25, Bruce tab, pp. 2-3. The cure, as Pontiac found out, was to get rid of the borax, which was done. The resultant Bruko 27 soap-only lubricant worked fine and is still in use. Tr 6108-17 (Kopchick); Def. Proposed Finding No. D-4; Def. Ex. A-25, Bruce tab, pp. 1-2." (Defendant's Comment on Plaintiffs' Proposed Fact Findings 75-110, p. 3.)

From this defendant urges that the inference be drawn that borax in practice was an inferior lubricant. But the truth that emerges from defendant's example is not that borax in a lubricant made it *universally* less satisfactory. Rather it is that borax in a lubricant *on occasion* was unsatisfactory. The evidence shows that where borax-based lubricants were unsatisfactory, they were replaced. The correlative truth must be that where borax-containing lubricants were retained, or were substituted for lubricants not containing borax, it was because they did the job better. That is the inference toward which the evidence propels me.

Accordingly, I find that it is the law of the case that borax-based lubricants selected for and used in actual production met the "satisfactory lubricity" requirement of the patent and the Circuit Court decisions construing it.

B. Accused Practices Held to be Infringing

1. Accused Practices Which Must Be Held to Infringe as the Result of the Law of the Case (Bumper-Accused Practices 4, 5, 12, 13, 36, 48, 49, and 51; Non-Bumper-Accused Practices 7, 9, 16, 17, 22, 25 (in part), 26, 27, 28, 30, 31, 37, 38, 42, 47, 54, and 56)

Those practices which respond literally to Claim 4 and "achieve easy cleanability in conjunction with satisfactory lubricity" (467 F.2d at 261) comparable to the prior trial practices, must be held to infringe. On this basis I find as infringing, in addition to the already adjudicated prior trial bumper practice, the following bumper practices:

Accused Practices 4 and 5	Cadillac's use of BL 246, 247, 247A or 249 (all soap and borax) during the 1959 and 1962 model years and thereafter (APTO, CAD:1)
Accused Practices 12 and 13	Chevrolet Livonia's use of Kearns 3833 and Pennwalt 1047 (both soap and borax) during the period 1958-1965 (APTO, CL:1)
Accused Practice 36	Fisher Body's use of Bruko D-122, Kearns DF-4800, or Pennwalt Drawcote 1044 (all soap and borax) from 1957-1960 (APTO, FBC:1)
Accused Practices 48, 49, and 51	Pontiac's use of BL 246 (the prior trial lubricant but for bumper parts) from 1955-1959, and BL PTD 1239A and BL 249A (soap and borax) from late 1958-1963 (APTO, P:2)

Without trying to describe them because they are numerous, varied and fully detailed in the pretrial order, I find that the following practices for the cold-forming of non-bumper parts are literally within the Henricks claim, and

produce the same combination of lubricity and cleanability characteristic of the prior trial BL 235 valve lifter and rocket practices: Accused Practice 7, APTO, CBC:1; Accused Practice 9, APTO, CD:1, Accused Practice 16, APTO, CP:1; Accused Practice 17, APTO, CP:1;* Accused Practice 22, APTO, DE:1; Accused Practice 25 (in part,** APTO, DP:1; Accused Practice 26, APTO, DR:1; Accused Practice 27, APTO, DR:1; Accused Practice 28, APTO, DR:1; Accused Practice 30, APTO, DR:2; Accused Practice 31, APTO, DR:2; Accused Practice 37, APTO, ID:1; Accused Practice 38, APTO, ID:1; Accused Practice 42, APTO, 0:1; Accused Practice 47, APTO, P:1; Accused Practice 54, APTO, SSG:1; Accused Practice 56, APTO, SSG:1.

2. TKPP is a Borax Equivalent, and the Use of it by Defendant as a Borax Substitute in Bumper Making Infringes (Accused practices 6, 14, 50, 52, and 53). TSP is also a Borax Equivalent.

(a) TKPP

By way of background, prior to the original infringement trial defendant moved to amend its complaint, which

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* Accused Practice 17 is included in a distinctive grouping by plaintiffs because molybdenum disulfide was a part of the lubricating process, although it is not claimed that use of that substance read on the patent. I should note that, while convenient for some purposes, the view I take of the infringement issues has been such as to make it inconvenient, and sometimes confusing, to follow plaintiffs' groupings. Hence I have attended upon their suggested categorizations in the reaching of the various decisions in this report, but do not separately advert to them in the writing of it.

** Accused Practice 25 involved the production of piston rods, studs and rings. For the reasons set forth at pages - , *infra*, the portion of the practice devoted to the production of piston rods has been held to be non-infringing. See particularly first footnote on page

theretofore accused only borax-containing lubricants, to include non-borax equivalents. The amendment was allowed by Judge Wright, *Devex Corporation v. General Motors Corporation*, 285 F. Supp. 109 (D. Del. 1968), and a new complaint charging infringement by the use of borax substitutes was filed. See amended complaint, Princ. Doc., Tab 8d, ¶ 6.

The five accused bumper-making practices now to be considered involve the use of tetrapotassium pyrophosphate (TKPP) in the soap-based coating. In addition to the defenses common to all charges (no proof of better lubricity, cleanability, etc.), General Motors defends against the "TKPP" charges with the contention that there is no infringement because the melting point of TKPP is, contrary to the requirement of Claim 4, not " . . . below the melting point of the ferrous metal phosphate of said [the lubricant] coating."

I view the question of whether the use of TKPP infringes to be of substantial importance. TKPP came to be used in bumper production, where I believe the Henricks invention had its major utility. It was introduced after the patent was held valid, in an attempt to avoid infringement by adding to the then used soap composition an inorganic substitute for the borax it previously contained.

The pattern is clear.

Accused Practice 6 came to be used at Cadillac in 1964 and afterwards and involved the use of Bonderlube 201 or 202 (25% TKPP) over phosphate. It was the successor to Infringing Practice 5 which involved Bonderlube 247 and 247A (46-50% borax), or Bonderlube 249 (30% borax) (APTO, CAD:1-5).

Accused Practice 14 substituted Bonderlube 200 or 200A (20-25% TKPP) for the Kearns 3833 (45% borax) in Infringing Practice 12 at Chevrolet Livonia. The change came in early 1965 (APTO, CL:1-9).

Accused Practices 50, 52 and 53 used Bonderlube 200, 200A, 201, or 202 for bumper making at Pontiac and were the successors to a series of practices beginning with the prior trial bumper practice and ending with Infringing Practice 51 which had used Bonderlube 249A (30% borax). The TKPP use at Pontiac began with Accused Practice 52 about September 1963 (APTO, P:1-3, 6-17).

There is no evidence that TKPP was used for any purpose other than as an integral part of the soap lubricant application. TKPP was put in as a borax substitute, to help the soap do the job of efficiently lubricating the workpiece. That is why the question of whether substitution of TKPP for borax avoids infringement in the five accused processes under consideration is of more than passing significance. If the use of soap with TKPP were held not to infringe, defendant would not only have defeated the attempt to charge the five accused TKPP processes. It would have established that, at least by late 1963, another non-infringing alternative was available in the bumper area. On the other hand, if the use of TKPP as a borax equivalent infringes, it will be deducible that defendant could not readily avoid the patent's claims despite its recognition of their validity and its effort to find a non-infringing alternative.

It may be thought the question of whether TKPP in defendant's use was meltable at below the melting point of the ferrous metal phosphate of the coating is susceptible of a quick, easy answer to a scientific certainty. It has not proved to be so. Like the lawyers for both sides who have asked them the questions, the well-credentialed scientists called by the parties have differed on the melting point question.

For its part defendant points out that the handbook melting point of "ferrous [metal] phosphate" adverted to in the Henricks patent is 1050° C. (Princ. Doc., Tab 1, Col. 9, Line 9 of Table 1). The handbook melting point of anhydrous

TKPP is 1109° C.* Ergo, concludes defendant, TKPP is not meltable below the melting point of the ferrous metal phosphate, and its use does not preempt the patentee's rights. Plaintiffs reply that despite what the handbooks say about the melting point of anhydrous TKPP, in practice the TKPP in the coatings as applied by defendant would melt before the ferrous metal phosphate.

I think plaintiffs have the better of the argument.

The patent does not speak of the melting point of ferrous metal phosphate in a crucible. Claim 4 adverts to "the ferrous metal phosphate of said coating." *In situ* that would be close

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* While anhydrous TKPP's melting point is 1109° C. (Van Wazer, Tr. 4680-4681), hydrated TKPP has a handbook melting point of 180° C. (Othmer, Tr. 766-768; DX A-20, p. 256). A distinguished expert witness for plaintiff testified that the aqueous character of the coating recipe for the application of the TKPP would cause it to become hydrated (Othmer, Tr. 868, 869, 873-876). On the other side an expert witness for defendant testified based on x-ray patterns that, despite the seeming logic of the view of plaintiffs' expert, in fact the TKPP in defendant's coatings was not hydrated (Van Wazer, Tr. 4657-4670; DX A-24-4). Plaintiffs counter that x-ray tests detect crystal structures (Van Wazer, Tr. 4751-4752), but would be ineffective respecting the coatings here since, plaintiffs say, they are amorphous (Friedberg, App. 4, 1637-1638). Indication of loss of water vapor at relatively low temperatures in thermo-metric tests (DX A-31, p. 8; see also Van Wazer, Tr. 4657-4670), tends to support plaintiffs. If the TKPP in the coating were hydrated, the waters of hydration (or crystallization) would migrate from the chemical at 180° C. (Othmer, Tr. 766-768). Plaintiffs argue that the melting point of the hydrated compound is the melting point of the TKPP within the meaning of the patent. Its expert supported this point of view (Othmer, Tr. 737-745), and so does the chemical handbook (DX A-20, p. 256). Whether the TKPP as applied was hydrated, and whether the temperature level at which it would lose its waters of hydration is its melting point, are questions I need not decide since, in the view I take of it, plaintiffs must prevail even if the TKPP as applied were anhydrous.

to the melting point of the steel coated by the phosphate (Othmer, Tr. 747, 793-812, 825-828; PX A-73a), or in the area of 1525° C. (Friedberg, Tr. 2849-2964); PX A-74). It follows from this that the TKPP in the coating, even if anhydrous, would be meltable at a temperature below the ferrous metal phosphate of the coating (1109° C. vs. close to 1525° C.).

Experimentally, at the infringement trial plaintiffs' expert, Mr. Friedberg, had taken a blank which had been coated with Bonderite 181X and Bonderlube 246 (15% borax) and placed it in a furnace. The temperature in the furnace was raised to 1000° C. He removed the blank from the furnace and found that all of the soap and borax had disappeared but the phosphate coating was still intact. From that test, Mr. Friedberg concluded that the borax melted before any melting of the phosphate including the zinc phosphate and the ferrous phosphate of the coating (Friedberg, App., Vol. 4,* 1572-1575; PX-79).

A similar experiment was run by Friedberg for TKPP at the accounting trial. Mr. Friedberg formed a phosphate coating on a steel panel with Bonderite 114X and coated it with Bonderlube 202, which was used in certain of the accused practices and contains 24.8 percent TKPP. He placed the panel on top of an aluminum plate provided with a thermocouple and placed the aluminum plate on an electric hot plate. He heated the assembly up to 382° C. At 93° C., the lubricant coating was liquid and boiling. It turned brown at 149° C. At 288° C. it was a darker brown and at 382° C. it was sort of bluish (Friedberg, Tr. 536-537, 545-546, 555-558, 562; PX A-61b-1). From the liquification of the lubricant mix at that temperature, Mr. Friedberg concluded that the TKPP in

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* Refers to volume of appendix filed in the appeal to the Third Circuit.

this system was completely meltable at 93° C. (200° F.). This result is the same as the result which he had obtained for the borax-containing lubricant that he tested for the infringement trial (Friedberg, Tr. 558, 562). Borax concededly fits the patent's melting point requirement.

Mr. Friedberg explained that when one mixes a first chemical compound with a second chemical compound, or with several compounds, the melting point of the pure material is changed. The mixture has a new melting point (Friedberg, Tr. 696-697). This is consistent with the testimony of defendant's expert witness, Dr. Van Wazer, who explained mixtures using a chart of a TKPP and phosphorus pentoxide mixture (DX A-24, Tab b). The melting point of pure TKPP was given as 1109° C., but the melting point of the mixture was lowered as various amounts of phosphorus pentoxide were added (Van Wazer, Tr. 4723-4725A).

I find plaintiffs' explanations persuasive. Further, I note that defendant did not introduce any evidence, apart from its handbook melting points of pure anhydrous TKPP and ferrous metal phosphate, of the melting point of TKPP in the coating itself. Nor did it offer experimental proof to show that TKPP's "meltability" in the coating diverged materially from the melting point of borax as both related to the melting point of the ferrous metal phosphate.

In reaching this conclusion I have taken note that in their case against Rockwell plaintiffs filed interrogatory answers pegging the melting point of the ferrous metal phosphate of the coating at 1050° C. (DX A-48, Item 14, P. 7 and DX A-2, Item D-3, p. 4). Defendant argues that this is a wobble, and that there has been other melting point vacillating by plaintiffs. I agree, and had the issue been closer this might have been enough to tilt the decision defendant's way. But, despite plaintiffs' positional trembles, it seems to me that the evidence shows that once the ferrous metal phosphate was bonded to

the workpiece its true melting point would be higher than the 1050° C. handbook melting point, and that, at the other end, the melting point of the TKPP in mixture with soap would be lower than the 1109° C. attributed as the melting point of the pure anhydrous substance.

But, defendant argues, what the Seventh Circuit saw as the "amorphous glass materials which contributed significantly to the lubricating value of the [borax-containing] coating" (321 F.2d 237), are not shown to be duplicated in TKPP-containing coating. While I agree that plaintiffs have not proved that TKPP behaves to produce the same materials as did borax, the Third Circuit recognized that variations were possible, and permissible.

> "Moreover, it may be that chemical reactions differed in degree, and perhaps in kind as well, in different applications of the Henricks process. . . . it is not claimed that in every Henricks mix under every temperature, chemical reaction and its products will be identical." (467 F.2d 261-262).

I conclude that the TKPP in Accused Practices 6, 14, 50, 52, and 53, as it existed in coating used by defendant, was meltable at a point below the melting point of the ferrous metal phosphate of said coating. The practices were used to accomplish the same results as the accused and infringing borax lubricated processes they replaced. That being so, and since as I have found they literally read on the patent, they are found to infringe.

(b) TSP

The use of Bonderlube 242, 242-O and 242-W, containing from 11 percent to 53 percent trisodium phosphate (TSP) is charged by plaintiffs in Accused Practices 3, 11, 15, and 45. The melting point controversy is about the same as the argument about TKPP, and I resolve it the same way.

Anhydrous TSP has a melting point of 1340° C. (Othmer, Tr. 866). Waters of hydration begin to migrate from hydrated TSP at 73.4° C., and this is its handbook melting point (Othmer, Tr. 789-790; DX A-20, p. 275). The Friedberg tests showed that the TSP in the coating system to which it was experimentally applied melted at 82° C. — 93° C., which was the same result he got for borax at the prior infringement trial (Friedberg, Tr. 546-548, 562; PX A-61b-1). Apart from its reliance on handbook references to the crucible melting point temperature of ferrous metal phosphate and anhydrous TSP, defendant offered no evidence tending to show that *in situ* the melting point of TSP was higher than the melting point of the ferrous metal phosphate of the coating.*

C. Accused Practices Held to be Non-Infringing

1. Practices as to Which Little or No Cleaning was Required do not Infringe (Accused Practices 2, 3, 10, 11, 15, 19, 20, 21, 25 (in part), 33, 34, 35, 39, 40, 41, 44, and 45)

It has emerged as a central truth that, in general, high content (15% or more) borax or equivalent lubricants are used in

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* While for completeness the literal sufficiency of TSP as an inorganic substance with a melting point within the patent's claims is here found, for reasons later explained none of the accused practices employing TSP are found to infringe. This is because where TSP is part of the lubricant (Accused Practices 3, 11, 15, and 45) cleanability is not shown (pp. 39-43, *infra*). And where as part of a rinse (Accused Practice 29), it is not shown to contribute to lubricity or cleanability (pp. 44-51, *infra*).

bumper making with relatively light phosphate coatings, and low borax content (less than 15%) lubricants are used on heavy phosphate coatings in other manufactures.

In bumpers impeccable cleaning is required to allow for unblemished plating. In processes where there is no plating, the cleaning step is less important. The prior trial BL 246 bumper process exemplifies the careful cleaning needed for bumper making (316 F. Supp. 1380-1382). The prior trial rocket and valve lifter practices (*Id.*, at 1382-1389) illustrate the much less rigorous cleaning required in many of the accused practices. As I have held, to give effect to the Third Circuit decision, accused practices in both categories must be held to infringe.

But there are a number of practices accused by plaintiffs which, unlike the prior trial practices, require either no cleaning or so little in the way of cleaning as to be insubstantial. In such cases, cleaning as such is simply not a part of the process. As to these, defendant argues that ease of cleaning is an element vital to the life of the patent, and that there can be no infringement without using that advantage.

I think defendant is correct. There can be little doubt that if the patent validity battle before the Seventh Circuit had been fought on ground involving processes requiring little or no cleaning, the patent would have been invalidated. What was found to be the happy confluence of cleanability and lubricity saved the patent from a literal construction which " . . . would monopolize the whole broad field of metal forming with any use of a dry soap and borax over phosphate at any temperature or pressure, regardless of the results" (382 F.2d at 23). The monopoly the Seventh Circuit sought to narrow would be broadly conferred were the patent extended to include uses of soap and borax resulting in improved lubricity

only. To say it another way, construing the patent to apply to all borax-content coating achieving satisfactory lubricity, regardless of whether ease of cleanability was utilized (or indeed achieved),* would be to allow plaintiffs to "monopolize the whole broad field of metal forming" in a way that was never intended.

For their part plaintiffs rely on the proposition that a user of the substance of a patented invention will not avoid infringement by failing to utilize all the benefits of the invention. While that is certainly the law, *Hobbs v. Beach*, 180 U.S. 383 (1901); *Balaban v. Polyfoto Corp.*, 47 F.Supp. 472, 480 (D. Del. 1942), that proposition does not fit the facts here. In the matter at bar, but for ease of cleaning, plaintiffs would have no invention. This is not the case of a substitute mechanism capturing the germ of the patented machine but performing less than all of its functions. See, *e.g.*, *Hobbs v. Beach, supra* at 401. Here there would be no patent if only satisfactory lubricity was the result. The invention is not soap and borax over phosphate. It is soap and borax over phosphate producing the practical result of satisfactory lubricity and cleanability.

Applying the finding that processes which involve little or no cleaning do not infringe to the accused practices here, I find as non-infringing Accused Practices 2, 15, 19, 20, 25 (in

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* Whether those parts not actually cleaned could have been cleaned in an easy commercial way is an open question. While plaintiffs offered laboratory proof on the subject (Friedberg, Tr. 482-522), to accept those proofs in place of actual production experience would be a departure from the course followed in adjudicating lubricity.

part,* 33-35,**, 39,*** 40, and 41, all of which require no chemical cleaning (APTO, BM:5, CP:12, CT:5, DP:9-10, FBC:1, 14-15, ID:10-11, NDH:4, 6).

I further find as non-infringing Accused Practices 3, 10, 11, 21, 44, and 45, which are heat-treated with the result that any surface detritus would be removed, including even the residue which it has been postulated would have been left had the German process been employed (APTO, BM:6-8, CDF:1-6, CTF:1-5, O:27-31).****

A separate word should be said about the accused practices involving TSP in the lubricant.

Although TSP has been found to qualify as an inorganic substance falling literally within Claim 4 (pp. 37-38, *supra*), its contribution to the cleanability claimed by the patent is nil. TSP-containing Bonderlube 242-O was used to make axle shafts at Buick (Accused Practice 3), and Oldsmobile (Accus-

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* The portion of Accused Practice 25 involving the production of one-inch piston rods required no cleaning (APTO, DP:9-10).

** Accused Practices 33, 34, and 35 involved cold heading window regulator bearing studs and door lock striker pins, with oil being applied along the line. The only cleaning done was by a vapor degreasing step, with the door lock striker pins produced by Accused Practices 33 and 35 also requiring heat treating (APTO, FBC:1, FBC:14-15). Compare Accused Practice 32, which involved the application of oil during cold forming, and therefore required degreasing, but which also utilized prior trial cleaning steps (APTO,DE:6).

*** The accounting pretrial order is silent as to cleaning for Accused Practice 39 (APTO, ID:10-11). Cleanability has not been proved.

**** In this same category is the production of Oldsmobile pin gears for the 1961 model year. While not given an accused practice number, these were made by a process which would appear to infringe if cleanability were proved (APTO, O:34-37, especially ¶ 21).

ed Practice 45), and rear wheel spindles at Chevrolet Detroit Forge (Accused Practice 11) (APTO, BM:6-8, CTF:1-5, O:27-31). Bonderlube 242-W was used to make transmission main shafts at Chevrolet Munsie (Accused Practice 15) (APTO, CM:1-3). None of these practices was of the sort which, like the prior trial valve lifter or rocket practices, required cleaning, much less the careful pre-plating cleaning needed for the prior trial Pontiac bumper practices.

The use of TSP to achieve lubricity only is instructive. Although literally reading on the patent, as I have found it does, to accord its use a patent monopoly would be to extend the ambit of the patent beyond those uses in which the need for commercial cleanability combines with satisfactory lubricity to create the unexpected advantage the Courts of Appeals have required. This contrasts with the use of TKPP as a borax substitute in bumper making, which I have held does infringe because such practices did require, and did achieve, commercial cleanability.

2. Practices in Which Borax Rinses were Used as Neutralizers do not Infringe (Accused Practices 1, 2, 8, 18, 20, 23, 24, 32, 34, 35, 39, 43, 55, 57, and 58).*

Plaintiffs charge as infringing a number of processes where borax was used in the rinse to which the metal blank was subjected after phosphating but before the application of the soapy lubricant. These practices, all differing from the prior

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* It should be noted that of these accused practices five have been held in the preceding non-infringing because not cleaned (Accused Practices 2, 20, 34, 35, and 39), and two will also be held non-infringing at pages 53-56 hereafter on factual grounds (Accused Practice 1 in part, and Accused Practice 8).

trial practices where the borax was an integral part of the lubricant, are as follows:

> Accused Practice 1. Bonderlube 265 (soap only) following a Parcolene 21 borax-containing rinse (APTO, ACSP:1-2).
>
> Accused Practices 2, 8, 18, 20, 23, 24, 32, 34, 35, 39, 55, 57, and 58. Bonderlube 234 (soap only) following Parcolene 21 or Stancote L borax-containing rinses (APTO, BM:1, CBC:1, CP:1, CT:1, DM:1, 5-7, DE:1, FBC:1, ID:1, SSG:1-3).
>
> Accused Practice 43. The Oldsmobile usage of J&L Steel in the period from January 1962 through model year 1963, where MA88 borax-containing rinse was allegedly used (APTO, O:1).

Plaintiffs argue that the use of a borax (or equivalent) rinse infringes since it causes borax to be deposited on the workpiece to be combined with the then-applied soap film atop the phosphate on the workpiece. Splitting one step of a process into two does not avoid infringement where the combined steps and the original process are substantially identical or equivalent in terms of function, manner and result. *Matherson-Selig Co. v. Carl Gorr Color Card Inc.*, 301 F.Supp. 336, 349 (N.D. Ill. 1967). Thus, plaintiffs say, the purpose and effect of a borax-containing rinse is the same as if borax were already combined in the soap.

Plaintiffs begin with the submission that borax-containing rinse deposits borax on the workpiece (Othmer, Tr. 763-764; Rabinowicz, Tr. 117-175; PX A-2i). While they offered no credible quantitative proof as to amount of borax from the rinse likely retained in the coating after the lubricant bath, I am inclined to credit the testimony that at least some borax stayed on the workpiece. Plaintiffs also point to Dr.

Rabinowicz' laboratory tests which they say prove that borax and TSP dipped workpieces are more slippery in pin-on-metal tests than phosphate and soap coated blanks without intermediate borax or TSP rinses (Rabinowicz, Tr. 117-178, PX A-16; Rabinowicz, Tr. 208, PX A-25).

Again I need not resolve the conflict between Dr. Rabinowicz' tests and the varying laboratory results reached by defendant's expert, Dr. Ludema. For, as the Third Circuit found production experience superior to chemical disputation as to how the result occurred, so I, in applying the law of the case, have decided to give controlling weight to in-production lubricity and cleanability, rather than differing laboratory predictions as to how particular lubricants might be expected to behave on the cold-forming line. Applying the same reasoning here, I find Accused Practices 1, 2, 8, 18, 20, 23, 24, 32, 34, 35, 39, 43, 55, 57, and 58 to be non-infringing. Here is why.

(a) Put negatively, there was not a shred of evidence that borax (or equivalent) rinses were employed for the purpose of enhancing either the lubricity of the workpiece, or its post-formation cleanabilty.

(b) The record as a whole demonstrates that the only purpose of the borax in the accused rinse processes was to neutralize acid carryover from the phosphate bath. The acid liquid from the phosphate bath tends to remain on the work and be carried over into the lubricant bath. The action of the soap in the lubricant, as well as the life of the soap bath, is adversely affected by such carryover (Gibson, Tr. 1727-1730). "Rinsing techniques are quite necessary" (Henricks, Tr. 3721), since they neutralize the acid phosphate carried on the work before the work reaches the soap bath (France, Tr. 7387-7388). This could be done by a vigorous water rinse (Wojtowicz, Tr. 5738-5739).

It can also be done by adding sodium hydroxide to the soap bath from time to time so as to restore the pH of the soap bath (Gibson, Tr. 1729-1731).

A chemical neutralizing rinse is another way to overcome this problem (Henricks, Tr. 3721-3722). The chemical neutralizer undergoes chemical reaction with the acid phosphate carryover on the work and brings the pH or acidity to a value similar to that of the soap bath, so that the lubricant is not adversely affected by the carryover. This purpose and action of neutralizer rinses is described in Parker (Hooker) technical papers and customer literature, as well as in such literature of Amchem and other suppliers (*e.g.*, DX A-25, Parker tab hand pages 131-148; Pennwalt tab, page entitled "Fosrinse R-1"), and was the subject of testimony by Messrs. Wojtowicz of Montgomery and Gehman of Amchem (Gehman, Tr. 3990-3996; Wojtowicz, Tr. 5738-5739). Townsend of Delco Remy likewise so testified (Townsend, Tr. 3878). This record testimony stands uncontradicted.

(c) The use of borax as a neutralizer in a rinse was recognized by Henricks himself in Example XXXV of his 1950 patent application which discusses a cold-forming process using zinc phosphate followed by a borax-containing rinse (PX 3, p. 63). In the words of the example, after a zinc phosphate coating the work " . . . was given first a cold running water rinse followed by a hot borax rinse of 1½ to 2 ounces per gallon of borax *to neutralize any acid residue.*" (Italics added. *Ibid.*) Henricks cancelled that example when the patent examiner required that the specification be shortened and limited to "such parts of it as are commensurate with claims that applicant will continue to prosecute" (PX 3 at pp. 63, 106.)

This disclaimer of Example XXXV as outside of the claims was entirely consistent with the Henricks testimony that

neutralizing rinses were old and well known, and not his invention.

(d) Henricks' understanding of the use of borax as a neutralizer in withdrawn Example XXXV was not the product of a flash insight. The use of neutralizing rinses, including both borax and trisodium phosphate to overcome the acid entrained on zinc phosphate rust-proofed treated work is disclosed in U.S. Patent 2,120,212 (1938) (DX A-54). Whether this, and other contended-for examples of prior art are sufficient to avoid the extension of the patent to rinses is a question of law with which I need not grapple, since it is obvious that Henricks did not invent borax as a neutralizing rinse, and did not claim to.

(e) The evidence is uniform to the point that defendant *thought* it was using borax rinses to neutralize acidity, and not to get added lubricity or cleanability. There are also good indications that defendant did not in fact achieve better lubricity or cleanability from the use of borax rinses.

For example, Accused Practice 1 involved a heavy phosphate coating (Bonderite 181X) with a soap (BL 265) coating preceded by a borax (Parcolene 21) rinse. The practice ran from 1959 to 1963. In 1963 defendant adopted Non-Accused Practice A in which the borax neutralizing rinse was replaced with a non-borax neutralizing rinse (APTO, ACSP:1-6).* The non-accused practice continued from 1963 until the expiration of the patent in 1969. Since there was no different cleaning employed, it is inferable that the presence of absence of borax in the rinse did not affect cleanability.

The same pattern appears with equal sharpness in the production of universal joint bearing races and propeller shaft ends at Chevrolet Parma. From 1957 to May 1963 a borax

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* For finding as to changeover, see pages 54-55, *infra*.

rinse was used after phosphating and then a highly boraxed soap lubricant added (Accused Practice 17). From May 1963 to May 1964 the borax was taken from the lubricant but the borax rinse retained (Accused Practice 18) (APTO, CP:1-9). From May of 1964 onward the borax rinse was abandoned in favor of a non-borax neutralizer (Non-Accused Practices K and L) (APTO, CP:1). Neither the alleged lubricity nor cleanability features of Henricks' Claim 4 appear to have been missed.

(f) The prior trial practice by Diesel Equipment Division of making hydraulic valve lift plungers involved, it will be remembered, BL 235 which contained 3 percent borax and 2 per cent sodium nitrate. The prior trial Pontiac rocket practice involved the same lubricant. These were held to be non-infringing by Judge Wright and, for reasons previously expressed, must now be regarded as infringing as a result of the Third Circuit's reversal. But both prior trial practices *also* involved borax rinses (Parcolene 21 and 20, respectively) (APTO, DE:1; P:1). As best as I can tell plaintiffs did not urge this circumstance as an additional argument in favor of infringement, although such an argument might have been expected had plaintiffs believed the function of the rinse was to deposit more borax on the workpiece. The two referred-to prior trial practices (borax rinse plus borax lubricant) were not unique. See, *e.g.*, Accused Practices 17, 40, 41, 47, 48, 49, and 56.

(g) If, as plaintiffs now suggest, accused rinse processes had an effect of enhancing lubricity and cleanability by dispensing more borax on the part being cold-formed, the direct way to have accomplished that result would have been to include a higher quantity of borax in the already borax-containing lubricant. If borax in the rinse were supposed to serve the same purpose as borax in the lubricant, the purpose could be accomplished more easily (and probably more

cheaply) without the rinse. The logic that the borax in the rinse was aimed to do something other than what was accomplished by the borax in the lubricant seems inescapable, and entirely compatible with the rinse-as-a-neutralizer testimony.

Accordingly, the practices in which borax was used as a neutralizer in the rinse, are not infringing.

3. Practice in which a Trisodium Phosphate Rinse was Used as a Neutralizer does not Infringe (Accused Practice 29)

Trisodium phosphate (TSP), found to be an equivalent inorganic substance fitting within Claim 4,* was used in a neutralizing rinse as part of Accused Practice 29. In that practice numerous products were cold-formed at defendant's Delco Remy division through the use of a trisodium phosphate rinse as an intermediate step after the metal was phosphate coated and before the application of Montgomery DF 1101 soap (APTO, DR:1-2).

The same reasoning for finding non-infringement of the borax neutralizing rinses applies with equal force to the TSP rinse in Accused Practice 29. Indeed, the function of the rinse step as neutralizing the acidity of the phosphate undercoat rather than as enhancing lubricity or cleanabilty is shown by the shifting in and out of this practice to non-accused rinse techniques. For example, the DC generator frame was one of the parts made by Accused Practice 29. The frame was made with the help of a TSP neutralizing rinse from November 1954 to August 1957. Both before TSP was used (1951-1954) (APTO, DR:7) and later (after 1957), a water immersion was

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* See pages 37-38, *infra*.

substituted (*Id.*). The water immersion is Non-Accused Practice Y (APTO, DR:3, 12). The use of an intermediate water rinse bracketed the use of TSP. The only purpose TSP could have served was to avoid the pH problem in the soap bath.

Accused Practice 29 supports the conclusion that the neutralizing rinses were not in design or result related to lubricity or cleanability.

4. Practices Determined not to Involve the Use of Borax (or Equivalents) do not Infringe (Accused Practices 1, 8, and 46).

Considering the many years which have elapsed, the parties have done a remarkable job in retrieving information respecting the accused processes. The result was the formulation of Appendix II to the Accounting Pretrial Order, containing agreements as to the operation of the accused practices, their duration, the materials used, parts produced, etc. The assemblage of these materials saved weeks of additional testimony and eliminated large areas of potential controversy.*

While the vast bulk of the processes were described by agreement, a few disputes remain. Although they involve

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* In their post-trial brief plaintiffs charge defendant with various acts of bad faith, including assaults on its trial tactics. These are generally considered as part of the discussion of multiple damages at pages 66-70, *infra*. In a specific way, however, I will here note that defendant merits a major share of the credit for the formulation of Appendix II of the pretrial order. Its counsel could have used their client's economic muscle to try to uncompromisingly put plaintiffs to their proof in every detail, thus prolonging the case, and maximizing plaintiffs' burden. Instead defendant was flexible, cooperative and forthcoming. Its willingness to pull the laboring oar in the formulation of the pretrial order was in this spirit.

almost entirely the question of whether borax rinses were used, and such has been held in the preceding section to be non-infringing, in the interest of completeness the disputes will now be resolved.

(a) Accused Practice 1 (After 1963)

Accused Practice 1 charges the use by defendants beginning in 1959 at its AC Spark Plug Division of a Parcolene 21 borax rinse to help cold form spark plug shells and shields (APTO, ACSP:1). The rinse was applied by Braun Engineering which precoated the steel. Plaintiffs contend that Parcolene 21 rinse was continued after 1963. Defendant argues that in 1963 Braun came to use Parcolene 24, a non-borax rinse.

Neutralizing rinses of the sort represented by Accused Practice 1 have already been found to be non-infringing. And in another case it might be left at that, since that finding moots the dispute. But here it seems right to tie up as many potential loose ends as possible. Hence, I decide the question.

On defendant's side is direct testimony from Ross Perry, formerly of Parker, who initiated the change at Braun from Parcolene 21 to Parcolene 24 (Perry, Tr. 6590-6591, 6605-6618). Perry testified the change occurred in 1963 (Perry, Tr. 6630). See also, Tr. 6622-6624, DX A-27-2.

Against this plaintiffs cite an affidavit by Braun indicating the use of a Parker "Borox" dip (PX A-267). The Braun attestation was based on information furnished by a then Braun employee named Affeldt (PX A-435). Mr. Affeldt testified on deposition that his memory at the time he made his affidavit was that the rinse continued to be borax (PX A-436). Despite this, relying on Parker sales summaries prepared for this litigation (DX A-77-5; PX A-428), Braun changed its interrogatory answer to eliminate the reference to a borax rinse.

The original Parker records were destroyed in 1976. Although there is evidence that the destruction was inadvertent (PX A-428), plaintiffs argue that the circumstances are suspicious and the destruction inexcusable.

Having considered both sides, I find that Braun ceased to use Parcolene 21 in 1963. I do because, quite apart from the Parker sales summaries, I give credit to Ross Perry, the witness who so testified.*

(b) Accused Practice 8

As with Accused Practice 1, the parties are in controversy respecting whether rinses did or did not contain borax. The practice was employed at Chevrolet Bay City to form steering knuckle parts and other miscellaneous parts. (Accused Practice 8 does involve one small claim of a direct borax-containing lubricant.)* (PX A-20).

The argument about the content of the rinses again centers on the reliability of the Parker sales summaries (DX A-77-5)

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* In 1968 AC began to make its own spark plug shells. These shells were coated identically to what I have found the post-1963 Braun process to have been (Non-Accused Practice A, APTO, ACSP:1). It is undisputed that Parcolene 24, not Parcolene 21 was used as the neutralizer (APTO, ACSP:2). The change from Parcolene 21 to Parcolene 24 by Braun in 1963, and the continued use of Parcolene 24 by defendant in 1968, is another example of the ability to shift from one neutralizing rinse to another with no evident loss of lubricity or cleanability.

* Sixteen of the nineteen 1967-1969 invoices submitted by Youngstown Sheet and Tube describe the coating Lansing applied as "zinc phosphate coat with Bonderite 181X, neutralize with Parcolene 21 and lubricate with Bonderlube 235 (5 minute min.) or equivalent". The other three state "zinc phosphate coat, neutralize and lubricate suitably for our Boltmaker operation" (PX A-227E). BL 235 is one of the prior trial borax-containing lubricants.

balanced against plaintiffs' showing that defendant's own standard purchase orders at least arguably required a borax neutralizer (APTO, CBC:11). Although agreeing with plaintiffs that the Parker summaries are somewhat tainted, there is no reason to think they are faked. It seems to me that they are better evidence than inferences to be drawn from purchase order language. Hence, while the issue is close, defendant has a little the better of it.

(c) Accused Practice 46

Accused Practice 46 charges the use by Oldsmobile of precoated steel purchased by defendant from Jones and Laughlin from about September 1963 through March 1969 (APTO, O:2). The question is the character of the coating.

It appears that from January 1962 through the 1963 model year, defendant's Oldsmobile plant had gotten bumper steel from Jones and Laughlin precoated on J&L's behalf by Precision Metal Coating Company. The coating process consisted of phosphating the steel and lubricating it with DA 2481, a Montgomery vegetable oil substance known as "Kold-Lube" (DX A-51-11, pp. 8-9) and containing no inorganics. In between the phosphating and lubricating, there was a borax neutralizing rinse, MA-88. This is Accused Practice 43 (APTO, O:13-14), which I have previously held to be non-infringing along with the other rinses.

Beginning in September 1963 J&L began to do the precoating itself. This is Accused Practice 46. As with Precision Products, the lubricant used by J&L was the without-organics Kold-Lube (DX A-51-11, pp. 8-9). There is no direct evidence that J&L thereafter used borax either in the lubricant mix or as a rinse. There is weighty direct evidence to the contrary. Witnesses Alexin, Butler, and Pomietto, each of whom participated in and had knowledge of the J&L Surfaglaze coating operation, testified that no material other

than the phosphate and the lubricant were introduced at any point in the process (Alexin, Tr. 5274; Butler, Tr. 5327-5331; Pomietto, Tr. 5340-5341, 5344-5346).

Plaintiffs' strongest piece of evidence to the point that borax was used in the J&L coating comes from the testimony of its expert Gavilovic. Dr. Gavilovic tested J&L samples run in 1974 with the same coating technique it had used since 1963. Using electron microprobe (Gavilovic, Tr. 953-954) and ion microprobe (*Id.* at 955, 957) analytical techniques, Dr. Gavilovic found boron in the samples (Tr. 1011-1013), which finding is consistent with the presence of borax (*Id.* at Tr. 1014-1015). Dr. Gavilovic's finding of boron in the samples I accept as fact. His conclusion that the boron necessarily evidenced the addition by J&L of borax I do not. Apart from the expert evidence which tends to undercut Dr. Gavilovic's conclusion (*e.g.*, Evans, Tr. 4489-4492; Vergosen, Tr. 4437), principally I am persuaded by the evidence of the witnesses who had actual first-hand knowledge of the J&L process, and who denied the use of borax in the lubricant or as a rinse.

I am also moved to this conclusion by plaintiffs' effort (Pl. Br. 61-63) to equate what is contended to be borax in the J&L coating with the borax in BL 235, citing Gavilovic (Tr. 8911). That J&L would have used the prior trial BL 235 lubricant to precoat bumper steel is not likely. The prior trial practices, using the relatively low borax BL 235 with heavy phosphate coatings to cold-form parts not usually requiring plating, are fairly typical of the use of that lubricant in the broader pattern of accused nonbumper practices tried out before me. In bumper making, by way of contrast, the pattern was to use a higher borax (or equivalent lubricant) over light phosphate. If J&L used BL 235 to coat the steel it was providing Oldsmobile for bumper forming, it would be the only example of that coating for that use in this case.

I conclude Accused Practice 46 does not infringe. Plaintiffs finally argue in the alternative as to Accused Practice 46 that it be found that BL 200, 201, or 202 (soap and TKPP) was used by J&L, if borax was not. This submission seems inconsistent with the Accounting Pretrial Order, in which plaintiffs, after J&L's process description of Accused Practice 46, stipulate that: "Plaintiffs do not accept the above representation of Jones & Laughlin and *contend that borax was applied to the steel* after it was phosphate coated." (Underlining added. APTO, O:16). But even were plaintiffs free to make a contention it appears they did not reserve, the case for a TKPP rinse at J&L is far weaker than the claim of a borax rinse. The borax hypothesis, which I have rejected, at least had behind it the testimony of a respected expert. The TKPP alternative submission is utter speculation.

D. Explanation and Table

To make a punctuation mark between the segment of the report (infringement) now concluded, and what follows (damages), a table has been prepared collecting in a short space the conclusions heretofore reached as to which practices (in addition to prior trial practices) infringe, which do not, and why:

TABLE

Accused Practice	Infringing Practices			Non-Infringing Practices		
	Practices controlled by prior trial bumper practice (a)	Practices controlled by prior trial non-bumper extruded parts practices (b)	Practices substituting TKPP for borax in bumper lubricants and providing lubricity and cleanability analogous to prior trial bumper practices (c)	Practices in which cleanability not shown (d)	Practices using borax or TSP as a neutralizer only - not shown to have purpose or effect of enhancing cleanability or lubricity (e)	Practices in which no borax (or equivalent) shown to be used (f)
1					X	X (after 1963)
2				X	X	
3				X		
4	X					
5	X					
6			X			
7		X				
8					X	X
9		X				
10				X		
11				X		
12	X					
13	X					
14			X			
15				X		
16		X				
17		X				
18					X	
19				X		
20				X	X	

TABLE

Accused Practice	Infringing Practices			Non-Infringing Practices		
	Practices controlled by prior trial bumper practice (a)	Practices controlled by prior trial non-bumper extruded parts practices (b)	Practices substituting TKPP for borax in bumper lubricants and providing lubricity and cleanability analogous to prior trial bumper practices (c)	Practices in which cleanability not shown (d)	Practices using borax or TSP as a neutralizer only - not shown to have purpose or effect of enhancing cleanability or lubricity (e)	Practices in which no borax (or equivalent) shown to be used (f)
21				X		
22		X				
23					X	
24					X	
25		X (in part)		X (in part)		
26		X				
27		X				
28		X				
29					X (TSP only)	
30		X				
31		X				
32					X	
33				X		
34				X	X	
35				X	X	
36	X					
37		X				
38		X				
39				X	X	
40				X		

41				X		
42		X				
43					X	
44				X		
45				X		
46						X
47		X				
48	X					
49	X					
50			X			
51	X					
52			X			
53			X			
54		X				
55					X	
56		X				
57					X	
58					X	
Totals	8	17	5	17	16	3

III. DAMAGES

A. Introduction

Plaintiffs claim that defendant's infringements warrant a compensatory award of $121 million. They also request interest which, were their compensatory damage claim fully allowed, would amount to about $141 million. Finally plaintiffs seek treble the amount of the claimed damages (*i.e.*, an additional $242 million) together with attorneys' fees of about $1.5 million. Hence, plaintiffs reach for a recovery of about one half billion dollars.

Not surprisingly, defendant dissents. It submits that as a matter of law and fact plaintiffs' recovery cannot include multiple damages or attorneys' fees. And it argues that even were plaintiffs to have proved that each of the accused practices infringed, damages could be no higher than $200,000. Lastly, defendant disputes plaintiff's right to interest.

In resolving these not-insubstantial disagreements I have opted first to decide the claims for multiple damages and counsel fees. Next determined will be the standard to be applied in arriving at a reasonable royalty. Thereafter, the facts relating to the usefulness of the Henricks process in bumper making and the forming of non-bumper parts will be found, and various of the parties' damage-related arguments will be resolved. Thus will the stage be set for the construction of hypothetical negotiations leading to a "reasonable royalty." Which will leave only the legal question of plaintiffs' entitlement to prejudgment interest to be decided. At the end will come the accounting.

B. Denial of Plaintiffs' Claim to Multiple Damages and Attorneys' Fees

Plaintiffs seek trebled damages under 35 *U.S.C.* § 284, which provides that "the Court may increase the damages up to three times the amount found or assessed." This is a penalty provision. It is discretionary, and applicable only if there is egregious conduct by the defendant, such as conscious, deliberate and willful appropriation of the patented invention without good faith belief of patent invalidity or non-infringement, which makes out a gross case of unreasonable conduct, and where the plaintiff has been blameless. *Enterprise Mfg. Co. v. Shakespeare Co.*, 141 F.2d 916, 920-921 (6th Cir. 1944); *General Motors v. Dailey*, 93 F.2d 938, 942 (6th Cir. 1937); *Sel-O-Rak Corp. v. Henry Hanger & Display Fixture Corp.*, 159 F. Supp. 769, 777 (S.D. Fla. 1958), *aff'd*, 270 F.2d 635 (5th Cir. 1959); *Wahl v. Carrier Mfg. Corp.*, 511 F.2d 209, 214 (7th Cir. 1975). An award of multiple damages typically requires willfulness by the infringer. *W. L. Gore & Associates, Inc. v. Carlisle Corporation*, ____F. Supp. ____, Slip Opinion at p. 4 (D. Del. 7/26/79). Where the question of validity is close, or novel, it has been held to be an abuse of discretion to award treble damages. *Yoder Bros., Inc., v. California-Florida Plant Corp.*, 537 F.2d 1347, 1383-1384 (5th Cir. 1976), *cert. den.*, 429 U.S. 1094 (1977).

The statute at 35 *U.S.C.* § 285 provides that "[t]he court in exceptional cases may award reasonable attorney fees to the prevailing party." The courts have confined attorney fee awards to those cases where exemplary and punitive relief is required because of bad faith, fraud, malice or similar unconscionable conduct. *ADM Corp. v. Speedmaster Packaging Corp.*, 525 F.2d 662, 664 (3d Cir. 1975); *Uniflow Manufacturing Co. v. King-Seeley Thermos Co.*, 428 F.2d 335 (6th Cir. 1970), *cert. den.*, 400 U.S. 943 (1970). An award is contraindicated in a hard and fairly fought case in-

volving difficult and doubtful points of law. *Pierce v. Allen B. Du Mont Labs, Inc.*, 297 F.2d 323, 329-30 (3d Cir. 1961). See *Dixie Cup Co. v. Paper Container Mfg. Co.*, 169 F.2d 645, 651 (7th Cir. 1948); *W. L. Gore Associates v. Carlisle Corporation, supra*, at p. 14 of Slip Opinion.

The most obvious stumbling block to plaintiffs' argument is that two highly respected jurists have reached the selfsame conclusions for which plaintiffs now accuse defendant of bad faith. Judge Robson in 1963 held the patent invalid (Princ. Doc., Tab 2). Judge Wright in 1970 held the patent had not been infringed. 316 F.Supp. 1376 (D. Del. 1970). Although both decisions were subsequently reversed, plaintiffs cannot brush General Motors' defense of its accused practices with the paint of egregious unreasonableness without splashing the same contumacious color on the decisions of these able judges. Plaintiffs have cited no case in which a defendant under such circumstances has been held to have acted in bad faith or in reckless disregard of the patentee's rights. This will not be the first.

The view which I take, *i.e.*, that the prior court findings of invalidity and non-infringement are incompatible with charges that defendant was guilty of *mala fides* or reckless wrongdoing, makes it unnecessary to consider in detail plaintiffs' barrage of particularized misconduct allegations. Nonetheless, I separately find that neither singly or in combination do the charges as to defendant's behavior involve the quality of misconduct required to sustain a multiple damages award or to meet the possibly less stringent test for awarding attorneys' fees.

For example, plaintiffs charge defendant with arrogance for relying upon agreements from its lubricant suppliers indemnifying it against the risk of being adjudicated an infringer. To the contrary, I find the willingness of suppliers to give indemnifications in the circumstances here to support

defendant's good faith in independently concluding that its practices did not infringe.

Another signal of defendant's bad faith, say plaintiffs, is its failure to have secured an opinion of outside counsel to buttress its own patent invalidity, non-infringement conclusions. While there may be cases where the procuring of outside counsel's opinion proved good faith, or its absence evidenced willfulness, this case is not one of them. Defendant's in-house patent attorneys have shown themselves to be eminently knowledgeable and superbly well qualified in the field of their expertise. Their views as to invalidity and non-infringement were sufficiently substantial to have won the support of Judges Robson and Wright. That it has been finally adjudicated they were in error is no cause to penalize defendant for relying on them.

Treating conclusorily with other of plaintiffs' "bad faith" contentions, I decline to find that defendant purposely withheld information, that it attempted to mislead the Court, that it took no reasonably effective steps to retain records, or that taken as a whole its responses to plaintiffs' pretrial discovery were calculated to deceive plaintiffs and their experts.

Having considered plaintiffs' various submissions, the history of the case and the record in its entirety impel me to conclude that defendant acted in good faith and not recklessly. There will be no punitive award in the shape of multiple damages. And plaintiffs will pay their own counsel fees.

C. Standard to be Applied in Determining a Reasonable Royalty

The statutory provision at 35 *U.S.C.* § 284 mandates the award of " . . . damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer. . . ."* *Trio Process Corp. v. L. Goldstein's Sons, Inc.*, 533 F.2d 126, 129 (3d Cir. 1976).

Where, as here, a patentee has not itself practiced the patented process or itself made, used, or sold the patented product, the patentee suffers infringement damages only in the amount of a reasonable royalty. In setting the reasonable royalty in such a case, account should be taken of the inability of plaintiff to benefit from the patent other than by collecting royalties, and the amount a reasonable licensee would agree to, each mindful of the fact that the licensor cannot benefit from the patent except by collecting royalties. *Trio Process Co. v. L. Goldstein's Sons, Inc., supra,* 533 F.2d at 129; *Ellipse Corp. v. Ford Motor Co.*, 461 F. Supp. 1354, 1362 (N.D. Ill. 1978).

The only rational way to determine reasonable royalties is by reference to hypothetical negotiations. Such negotiations are assumed to be between a reasonable prospective licensor and a reasonable prospective licensee, each of whom is informed as to the relevant facts. The factors that would enter into a royalty determination in such hypothetical negotiations

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* Section 284 differs from Section 4921, R.S. (the law prior to August 1, 1946) which permitted the patentee to recover the "profits to be accounted for by the defendant," as well as the "damages the complainant has sustained." 1 *Walker, Patents* (Deller Ed. 1937) p. 628; *Aro v. Convertible Top Replacement Corp.*, 377 U.S. 476, 507 (1964); *Dowagiac Mfg. Co. v. Minnesota* _____ *(1915).*

control the reasonable royalty to be awarded in an infringement suit. *Egry Register v. Standard Register,* 23 F.2d 438, 443 (6th Cir. 1928); *Horvath v. McCord Radiator & Mfg. Co.,* 100 F.2d 326, 335 (6th Cir. 1938); *Georgia-Pacific v. U.S. Plywood,* 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *modified,* 446 F.2d 295 (2d Cir. 1971), *cert.den.* 404 U.S. 870 (1971).

D. Resolution of Disputes as to Factors to be Considered in Fixing a Royalty

From the foregoing legal propositions neither side dissents. Where they come apart is in their respective views of what the hypothetical negotiators would as a matter of fact, and could as a matter of law, have considered in the bargaining process. The parties' contentions are prolix, and sometimes run on separate tracks. In sorting them out, I first find the facts relating to the usefulness of the Henricks process in the manufacture of bumpers, and then in the making of non-bumper parts. In the course of so doing the general effect of what will have been found as to defendant's use of the patent on plaintiffs' damages theories will be considered. Thereafter dealt with will be contentions advanced by defendant as to certain arguably value-diminishing factors. With this groundwork laid, the bargaining will be hypothesized and license terms (including a reasonable royalty) will be found.

1. An Overview

The parties agree that such advantages as the patent offered would have been taken into account by the hypothetical negotiators. They collide in their views as to just what those advantages were. Plaintiffs are lyrical in their praise of the Henricks process. Defendant trivializes it. Between plaintiffs' rhapsody and defendant's dirge lies the truth.

Because the discussion which will follow is lengthy, some initial comments about the parties' contentions will supply perspective.

The most important single disagreement between the parties centers on the question of whether defendant could have cold formed bumpers (and non-bumper parts) without the Henricks process. As plaintiffs see it, defendant had the choice between (i) infringing, by use of a cold forming operation, or (ii) not infringing by use of expensive "hot forging" and machining processes. Positing this as the choice, plaintiffs compare the benefit of cold forming using Henricks, with the cost and difficulty of other-than-cold-forming processes. By this comparison they seek credit for a portion of the defendant's royalty savings and gains which they allege came from using the Henricks process.

On this basis plaintiffs ask a royalty of 2.4 per cent of the sales price of defendant's bumpers to its dealers, for a total bumper royalty, assuming all processes accused in fact infringed, of $70,132,764. In the area of non-bumper parts, plaintiffs ask not a percentage of sales but of the savings and gains, again contrasting the cost of Henricks and the cost of hot forging or machining, on the continued hypothesis that but for defendant's use of their invention those would have been its only alternatives. Plaintiffs calculate defendant's savings and gains in the manufacture of non-bumper parts at $90,522,607. Of this figure they seek 56.16 per cent, or (assuming all accused processes in fact infringed) $50,833,172.

Plaintiffs' difference in approach between valuing their invention in bumper manufacture and valuing it in the making of non-bumper parts is not without foreseeable consequences. In the bumper segment of their claims, plaintiffs have a fallback. For if the premise that defendant could not have cold formed bumpers except with Henricks is found to be fallacious, an evidential basis for the making of an award

nevertheless exists. Bumper sales figures were proved, and a percentage figure may be rationally derived to apply to those sales by way of reasonable royalty even if (contrary to plaintiffs' contention) other non-infringing cold forming alternatives were available.

In plaintiffs' non-bumper claims, however, no such fallback is available. For by relying solely on savings and gains, plaintiffs supplied an all or nothing-at-all choice. Their comparison was between Henricks and machining or hot forging. The premise for which they advocated was that parts could be cold formed only through Henricks. The comparison between Henricks and machining or hot forging produced the savings of which they seek a share. But if non-bumper parts could be cold formed without Henricks, the comparison fails. *No savings and gains were proved between Henricks and other non-bumper cold forming alternatives, since plaintiffs elected to place sole reliance on the proposition that no such alternatives were available. And no sales figures for non-bumper parts were supplied such as might allow the development of a percent-of-sales royalty.*

The discussion which follows will first treat with the usefulness of the Henricks process in the making of bumpers. It will be found that the invention was advantageous, but not preemptive of the cold forming field. Although rejecting plaintiffs' proposition that there were no non-infringing alternatives available, the findings of value allow for hypothetical negotiations in a quantifiable way.

The findings as to the value of the invention in the cold forming of non-extruded parts will be otherwise. It will be found that there were numerous, often-used, non-infringing cold forming alternatives at hand to defendant, contrary to plaintiffs' claim that the defendant's choice was between Henricks and hot forging or machining. It will be concluded that in the non-bumper area the invention was of some (although not

great) value, but that plaintiffs' savings and gains evidence makes it impossible to quantify such value as it had in a legally acceptable way.

2. The Usefulness of the Henricks Process in Bumper Making

It was in the area of bumper manufacture that the Henricks invention found its greatest utility. Here it was that the high borax (or TKPP) lubricant taught by the patent found its greatest use. And it was in bumper making that cleanability, claimed by Henricks as a hallmark of his invention, was shown to be most needed as a predicate to plating.

But it is too much to claim, as plaintiffs have, that defendant would have been unable to cold form bumpers with reasonable commercial success absent the Henricks process. In fact, Henricks was thought by various of defendant's divisions to be a superior lubrication system for bumper making, but it was not the only system. The experience of each of defendant's divisions bears out this conclusion.

(a) Oldsmobile Bumpers

It is highly significant that during the entire life of the patent, Oldsmobile successfully made bumpers without using the Henricks process.

The early Oldsmobile process for cold forming bumpers from December 1949 to November 1953 was a non-infringing alternative (Non-Accused Practice KK). Phosphate and a variety of other non-borax or equivalent lubricants were used from November 1952 to the January 1965 model year (Non-Accused Practices LL, MM and NN) (APTO, O:3). Accused (but I have decided non-infringing) Practice 43 was used for a time in 1962 and 1963, and Accused but non-infringing Practice 46, from September 1963 to March 1969 (APTO, O:1, 2). In short, Oldsmobile was successful in cold forming

bumpers without the use of the Henricks process during the entire life of the patent. And its election to use non-borax (or equivalent) lubricants came despite its familiarity through usage of a high borax-containing lubricant to make rocket hardware in Infringing Practice 42, from June 1953 to January 1954 (APTO, O:1, 6).

Recognizing that the Oldsmobile attachment to non-infringing processes runs flatly counter to the preemptive advantages which they claim for the Henricks process, plaintiffs make two efforts to undercut the significance of the Oldsmobile experience.

First, plaintiffs point out that Oldsmobile Non-Accused Practice KK, running from December 1949 to November 1953, involved the application of Montgomery DQ 593 over phosphated flat polished, steel blanks (APTO, O:11-12). Montgomery DQ 593 is a wax-type lubricant which contains Degras castor wax, soap and (according to plaintiffs) 2.73 percent trisodium phosphate (Wojtowicz, Tr. 5665-5667). Although plaintiffs in the pretrial order have elected not to accuse the practice, they urge that defendant must affirmatively prove it does not infringe in order to rely on it as a non-infringing alternative. Defendant responds that it was entitled to assume that plaintiffs regarded the non-accused process as non-infringing, and that in all events the lubricant composition for Non-Accused Practice KK as sold to General Motors, had .59 percent trisodium phosphate and that the purpose of the TSP was to stabilize the emulsions (Tr. 5667).

Defendant has the better side of this argument. I do not find that the use (if it was used) of a relatively trivial amount of TSP as an emulsifier (which contrasts with the much larger borax or equivalent percentages in infringing bumper processes) contributed to lubricity or cleanability. There is no merit to plaintiffs afterthought-effort to charge as infringing

at trial what they had up to then opted to style as Non-Accused Practice KK.*

Plaintiffs also argue from a reference in a 1959 letter from a Pontiac employee to the Oldsmobile process as a "soap-boraz [sic] lubricant" (PX A-288), that Non-Accused Practices LL and MM were in fact infringing. They use the letter as the basis for a claim that they were in error in agreeing in the Accounting Pretrial Order to a description of those non-accused practices (LL and MM) as not containing borax. Although I would consider releasing plaintiffs from their stipulation if it were necessary to do justice, I decline to do so here. There is no showing that the letter is newly discovered by them, or even if it were, that this scrap of proof outweighs the evidence upon which they must have relied in making the judicial admission of "no borax."

To sum up, Oldsmobile's experience shows it was commercially practicable throughout the life of the Henricks patent to cold form bumpers without utilizing the Claim 4 process.

(b) Chevrolet Bumpers

(i) Chevrolet's Use of the Patented Process

While Oldsmobile shows defendant's ability to cold form bumpers without the Henricks process, the experience at its other divisions shows the development of a strong leaning to the patented technique.

At Chevrolet bumpers were hot forged until 1954 (APTO, CL:3). Under date of January 14, 1953, the Chevrolet Division submitted an Appropriation Request (PX A-130) for about $40,000,000, which was later revised upward to $46,621,000

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* "Plaintiffs do not accuse any of the lubricants stated in paragraph 4 above [including that of Non-Accused Practice KK] in the cold forming of bumpers. . . ." (APTO, O:12).

on December 10, 1954 to construct and completely equip a new plant in Livonia, Michigan, capable of producing "90 per cent of Chevrolet's overall requirements of Passenger front and rear bumpers ... of the types designed for 1955 Model production," to produce "Commercial (½, ¾ and 1 ton) bumpers" and to produce "springs" (PX A-130, p. 2).

Among other reasons, this new plant was needed, because:

> "Design changes for 1955 passenger car bumpers ... necessitate new processes and methods which obsolete the major portion of the existing fabricating, processing and plating equipment." (PX A-130, p. 7).

Furthermore, for 1955 there was "a radical change in the design of bumpers" to make them "an integral part of the overall car from an appearance standpoint." The Appropriation Request explained that these new designs could not be economically made by hot forging:

> "Due to the intricate curvatures of the proposed 1955 model car bumpers, it will be necessary to form the metal by the 'cold drawing' method in order to eliminate wrinkles and surface irregularities which would require excessive polishing after forming rather than by the present so-called 'hot forming' method." (PX A-130, p. 7.)

When this freshly minted plant began pumping out bumpers in 1954 the lubricant of choice was not the Henricks lubricant. Rather it was an application of plain soap (BL 215) over phosphate (Non-Accused Practice H) (APTO, CL:1, 3, 7).* The use of soap only BL 215 resulted in the satisfactory

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* Plaintiffs seek to be relieved of their pretrial stipulation to the effect that Non-Accused Practice H involved no borax. They argue that the

continued on next page

production of bumpers (Bolton, Tr. 4592-4594; Weil, Tr. 3140; Kary, Tr. 7464).

But it became apparent by 1957 and 1958, that Chevrolet-Livonia was experiencing two major problems: namely, with respect to the quality and cost of the bumpers manufactured (Kary, Tr. 7563, 7596). The plant had plating problems which were so severe that there were days at Chevrolet-Livonia in 1957-58 when bumpers could not be plated "because the quality was so bad" that the line had to be shut down and the employees sent home (Kary, Tr. 7546). A plant report for the week ended September 14, 1958, flags as unusual "... production problems being encountered on 1959 Model [bumper] Parts" (PX A-136).

A Chevrolet Lubricant Manual published in 1967 says that such problems may be caused by improper lubrication (PX A-126, p. 3). As I read the Manual, it recommends the use of soap and borax lubricants for severe draws (PX A-126, p. 5). This Chevrolet document was anticipated by a publication of defendant's Shop Lubrication Committee issued in December 1955 (PX A-129) and reissued in October 1959 (PX A-128) recommending a dry soap and borax film for use in severe working conditions (PX A-128 at 105-106; PX A-129 at 506-507).

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Parker specifications recommended the application of Parcolene 21 (90% borax) with the use of Bonderlube 215 over phosphated steel in cold forming (DX A-25). I decline to vacate the portion of the pretrial order dealing with Non-Accused Practice H because: (1) There is no showing that the information now relied on is newly discovered, (2) there is no showing that the inference plaintiffs seek to draw outweighs the evidence on which plaintiffs relied at the time they entered into the stipulation, *e.g.*, Kary, Tr. 7603, and (3) even if Parcolene 21 were used, its use would have been as a non-infringing neutralizer, not as a lubricant.

Departing from the usual practice of changing lubricants at the time of a model changeover (Herrmann, Tr. 4995-4997), Livonia switched in mid-November 1958 after the commencement of production of bumpers for the 1959 model from Bonderlube 215 (soap only) to Kerns 3833 (PX A-126; APTO, CL:1, 7) with full knowledge that Kerns 3833 contained borax (Kary, Tr. 7565-7566).

In the period mid-November 1958 until mid-January 1965, Chevrolet used soap and borax over phosphated steel to cold form about 93 per cent of its bumpers (PX A-285-2). Out of the 30,045,354 bumpers manufactured during this period, 27,882,018 used soap and borax, mostly Kerns 3833, with a minor use of Pennwalt's soap and borax Drawcote 1047 (PX A-285-2; APTO, CL:8). During the same period, Chevrolet avoided infringement to a limited extent by using a non-accused practice, Montgomery DA 2481 or DB 2481 (hereinafter 2481) because Oldsmobile had successfully used that product (Kary, Tr. 7465) (APTO, CL:8, 1; PX A-285-2).

The soap and borax lubricants Kerns 3833 and Drawcote 1047 (800 lbs. in 1961), as a percentage of the total lubricants used for the manufacture of Chevrolet bumpers for the period mid-November 1958 through 1964, comes out as follows (APTO, CL:8):

1958 — from mid-November — 100%
1959 — 100%
1960 — 91%
1961 — 66%
1962 — 97%
1963 — 96%
1964 — 100%

The record shows that the experience at Chevrolet-Livonia with the Montgomery 2481 had been unsatisfactory because that non-infringing lubricant created "Bonderlube impres-

sions" (Kary, Tr. 7490-7491) requiring Chevrolet to shut down its production line every hour or so for die cleaning (Kary, Tr. 7495, 7532). After having used Montgomery 2481 for 9 per cent of its total lubricant requirements in 1960, 34 per cent in 1961, 3 per cent in 1962, and 4 per cent in 1963 (APTO, CL:8), the lack of satisfaction with the lubricant caused Chevrolet to stop using it (Kary, Tr. 7490-7491). And this despite the fact that Montgomery 2481 was lower in cost per pound and lubrication cost per bumper than the soap and borax Kerns 3833 (PX A-285-2). Price of the chemical was not the consideration at Chevrolet-Livonia in any period in choosing Kerns 3833 over Montgomery 2481 (Kary, Tr. 7503, 7503-A).

I find that Chevrolet used Kerns 3833 as its dominant lubricating system from mid-November 1958 to mid-January 1965 because it was more satisfactory to Chevrolet in its bumper forming operations than the non-infringing Montgomery 2481 which Oldsmobile had used.

In the period mid-January 1965 until the expiration of the patent in March 1969, Chevrolet used soap and TKPP, which I have found to be a borax equivalent, over phosphated steel to cold form about 84 per cent of its bumpers. Out of the 25, 487, 109 bumpers manufactured by Chevrolet during that period 21, 244, 697 used a lubricant containing TKPP (Bonderlube 200 or 200A) (PX A-282-2).

The balance were manufactured through the use of a non-accused practice, Bruce's Bruko 27 or 27B (hereinafter Bruko 27) (APTO, CL:2, 8-9; PX A-285-2). The figures break down during that period to show that Chevrolet used soap and TKPP (Bonderlube 200) as a percentage of the total lubricants used for the manufacture of bumpers, as follows:

1965 — 50% (included Kerns 3833 in January)
1966 — 89%

1967 – 100%
1968 – 100%
1969 – until expiration – 100%

(APTO, CL:8-9.)

The Bruko lubricant – not accused and unquestionably not infringing – cost only half as much per bumper as the BL 200 (soap and TKPP) lubricant with which it for a time competed for Chevrolet's favor (PX A-285-2). Cost, along with the elimination of the risk that the inclusion of TKPP would be held to read on Henricks, argued for continued usage of Bruko. Yet despite Bruko's advantages, use of BL 200 lubricant quickly came to monopolize Chevrolet's bumper making operation (APTO, CL:9). Defendant's explanation that this occurred because the Bruko salesmen were not aggressive is lame and inconsistent with the documentary evidence (DX A-25; PX A-172). I find that, as with the switch from BL 215 (soap only) to Kerns 3833 (soap and borax) beginning in 1958, the choice of BL 200 (soap and TKPP) beginning in 1965 to the ultimate exclusion of Bruko 27 (soap only) was made because Chevrolet thought BL 200 was better suited to its needs than the non-infringing alternatives.

Plaintiffs argue that except through the use of the infringing process during the infringement period, Chevrolet could not have gotten the advantages of cold forming bumpers. From this premise they urge that but for the Henricks process Chevrolet bumpers would have had to have been produced by the old and expensive hot forging method, or if they were cold formed that the sheets of steel could not have been flat polished. Polishing, plaintiffs suggest, would have had to have been done after the bumpers were shaped, a much more expensive procedure since hand work would have needed to be done to clean the contours sufficiently for electroplating. They compute the saving (pre-forming flat polishing vs. post-forming contour polishing) at $1.53 per bumper, multiply

this by the 49,126,715 bumpers produced using the Henricks process from 1959-1969, and credit the Henricks process with saving Chevrolet over $75,164,000. While not relying upon savings as royalty measure for bumper manufacture, plaintiffs do point to that figure as tending to validate the $25,502,000 they seek on account of Chevrolet's infringement.

It is a fact, as I have found, that Chevrolet preferred soap and borax (and later soap and TKPP) to soap-only lubricants. And the reason was that Chevrolet thought that Henricks-type lubricants did a better job. But it is too much a leap from this to a conclusion that without using soap and borax or equivalent lubricants defendant would have had to hot pour its bumpers into molds, or to cold form them without the ability to first flat polish. Other non-infringing lubricants worked at Oldsmobile,* and likewise, as will be seen, at other divisions. I have no doubt that such lubricants could also have been made to work at Chevrolet.

What emerges from the evidence is the image of Chevrolet coming to use Henricks-type lubricants because they saw those lubricants as creating fewer problems than other lubricants. Other divisions at different times had and would come to different conclusions. It would be for the plaintiffs' negotiators to set a rate which would encourage Chevrolet to make the use of the Henricks process which it in fact did from 1957 to 1969. They would avoid grasping for a royalty level which would make Chevrolet turn to the available non-infringing alternatives. See *Foster v. American Machine & Foundry Co.* 492 F.2d 1317, 1322 fn. (2d Cir. 1974).

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* Indeed the genesis of plaintiffs' computations of savings from flat polishing stems from a 1950 article by McVey and Darsey reporting the success of the Oldsmobile (non-infringing) alternative (DX A-9, Item 1, p. 251).

(ii) The Shape of the Chevrolet Bumper Did Not Make Essential the Use of the Henricks Process.

In support of their effort to show the essentiality of the Henricks process, plaintiffs have attempted to connect a change to a borax-containing lubricant in 1958 to the need to form a more intricately shaped bumper. Plaintiffs' argument was that even if simple bumpers could be produced without Henricks, complex bumpers could not. The instrument for the effort to show that bumper shapes became more difficult to form (particularly in 1959), thereby requiring a better lubricant, was Hubert Shortt, the President of Technograph, one of plaintiffs' corporations. Without disparaging the sincerity of Mr. Shortt's opinions, I find them unacceptable.

Mr. Shortt had seen bumpers made only once, a couple of months prior to his testimony (Shortt, Tr. 2448-2449). He could not tell enough about bumpers to identify the specific construction of the Chevrolet 1958-59 front bumpers he showed in pictures accompanying his testimony (PX A-141-5 through 9). On direct examination he identified the 1959 model year front bumper as being of a massive one-piece construction and drew a cross section sketch of it (Shortt, Tr. 2273-2277; PX A-141-7A). On cross examination, Mr. Shortt again identified the 1959 Chevrolet front bumper as being of a massive one-piece construction and he again drew a cross sectional sketch of it (Shortt, Tr. 2455-2473, 2481-2482; DX A-66b). Mr. Shortt concluded from a slide show he produced that the 1959 model year bumpers were far more difficult to make than the 1958 bumpers (Tr. 2273-2274, 2474-2475), the 1959 model year front bumper was a "trouble-maker in here if there ever was one" (Tr. 2274) and that lubrication (presumably soap and borax) was required to make the part (Tr. 2275).

Robert Lawson is the master mechanic at Chevrolet-Livonia (Lawson, Tr. 3084-3085; DX A-33, tab 50). As master mechanic, Mr. Lawson is in charge of all manufacturing of bumper parts (Lawson, Tr. 3085-3086). Mr. Lawson testified that the 1958 model year front bumper was made in three pieces (Tr. 3157; DX A-66EE) and the 1959 model year front bumper was made in two pieces (Tr. 3158; DX-A-66CC). He further testified that the 1959 model year front bumper was an easier design to make than the 1958 model year, that the 1958 model year front outer wings were extremely difficult (Tr. 3160-3164) and that "I am confident that at no time were we really concerned about the lubricant as far as being able to make the part" (Tr. 3164). The lubricant used on the harder-to-make 1958 model year parts was soap only (BL 215) (APTO, CL:7).

Not only did Mr. Shortt misidentify the 1959 Chevrolet front bumper as being of a one-piece design, he included non-bumper parts (valence assemblies) as part of the one-piece bumper. Compare Shortt's sketch (DX A-66B) with the isometric view of the 1959 Chevrolet front bumper (DX A-66cc). Mr. Lawson testified that the valence assemblies were not part of the 1959 model year front bumper, were not made by Chevrolet-Livonia and were of much thinner gauge metal stock than the bumper parts (Lawson, Tr. 3158-3160).

Until confronted with an exhibit highlighting it, Mr. Shortt did not appear to know that the 1958 and 1959 model year bumpers were of a multi-piece design (Shortt, Tr. 2485). He also admitted he did not look at the engineering drawings defendant sent to plaintiffs regarding the 1959 model year front bumper parts (Shortt, Tr. 2497), which drawings would clearly have revealed that the 1959 front bumper is of a two-piece design.

Mr. Shortt's lack of expertise on the subject of the relationship between lubricant use and the intricacy of bumper

design was further shown by his identification of Pontiac's 1956 model year front bumper as being a "mammoth" one-piece design, and that this one-piece design included the "Dagmars" (bomb guards) (Shortt, Tr. 2280-2281; PX A-141-14). In fact, plaintiffs' Exhibit 63 from the infringement trial shows Pontiac's 1956 model year front bumper as consisting of five parts, Nos. 521374, 521771-2, and 521794-5. Those parts are clearly labeled on plaintiffs' Exhibit 63.

I give no credit to Mr. Shortt's opinions respecting the intricacy of various bumper designs. And I reject plaintiffs' assertion that changes in bumper design made essential the use of the Henricks process.

(c) Pontiac Bumpers

From 1952 through the 1955 model year, Pontiac cold formed by Non-Accused Practice QQ using non-infringing No-Mar a portion of the bumpers it sold, and purchased the remainder from outside vendors (APTO, P:6) including Houdaille (Pinner, Tr. 1133-1134, 1130-1131).

The use of No-Mar in Non-Accused Practice QQ made it necessary to spray a plastic coating on the blanks and, in many cases, on "both sides" of the blank. The sprayed plastic was "messy" as it got on "all surrounding areas;" it produces "a messy part that the workers hate[d] to handle as it require[d] wearing of gloves as well as the protective clothing such as aprons, etc." The parts had to be washed during the process to enable welding. "Trim and pierce operations pick[ed] up a lot of slug marks during the processing because the plastic adhere[d] to the dies. Slug and fine trim ha[d] a tendency to stick to the die causing these slug marks." The entire line had to be stopped in order to clean the dies and there was no production during that time (PX A-214-1; Herrmann, Tr. 4963-4965, 4968).

At the start of the 1955 model year, a purple Mar-proof coating was sprayed over bare steel. After baking, a plastic coating was sprayed on the blank. As of November 19, 1954, at least, a decision had been tentatively reached to replace the process (PX A-214-1).

In September, October and November of 1955, Pontiac used bumper Accused Practice 48 which consisted of sending the steel for bomb type bumper guards (Parts Nos. 521424-5 to Production Finishing Co. to be precoated with Bonderlube 246 (15% borax) over phosphate, the coated steel then being returned to Pontiac where it wa coated with Molycote and cold formed (APTO, P:6-7).

Thereafter Pontiac began the prior trial practice which consisted of coating flat polished steel blanks with phosphate, then immersing them in an aqueous solution of Parcolene 21 (90% borax) coating with Bonderlube 246 and thereafter deforming the steel blanks to form bumper parts, which practice was held to be an infringement by the Third Circuit (*Id.*, P:7-11).

Except for the 1956 model year, when Pontiac continued to use non-infringing Marproof or No-Mar for a limited number of bumpers, from December 1955 to August 1963, Pontiac used soap and borax over phosphated steel for its bumpers, as follows:

Lubricant	Period of Use
Bonderlube 246 (15% borax)	December 1955-December 1958
Parker PTD 1239A (45% borax)	December 1958-March 1959
Bonderlube 249A (30% borax)	March 1959-August 1963

(APTO, P:7, 9)*

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* The BL 246 practice is the prior trial practice. The PTD 1239A and BL 249A processes are Accused (and, I have found, infringing) Practice

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Pontiac considered the Henricks process as better than the Marproof wet lubricant (Weil, App. 7:3120;** Weil, Tr. 1695-1696; Herrmann, Tr. 4989-4990). It reduced die loading, down time, scratching of the workpiece, and hand polishing (Weil, App. 7:3096-3097).

After the installation of the Henricks process, Pontiac listed some of the "advantages" of the soap and borax lubricant (Bonderlube 246) over the use of the plastic spray lubricant (PX A-214-2, dated "shortly after October 31, 1955").

> "1. The new lubricant has superior drawing qualities, therefore it reduces scoring of the dies and parts. This has reduced the amount of down time needed to remove scores from the dies.
>
> "2. It is possible with the new lubricant, which is a dry coating, to keep the dies and presses clean. This was not possible with the sticky spray compound.
>
> "3. The use of the new lubricant eliminates the five men per shift, that were needed at the presses, to apply the spray compound. This is a savings of approximately $.05 per car."

Pontiac never considered the price of the soap and borax lubricant as the reason for choosing the Henricks process over

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51 (APTO, P:2-3). Infringing Practice 51 follows on the heels of the prior trial practice, utilizes high borax lubricants, and accomplishes the same results as the practice adjudicated by the Third Circuit as infringing. Defendant's continued effort to avoid the law-of-the-case determination that this practice also infringes (Defendant's Comment on Plaintiffs' Proposed Finding 344) is noted and rejected.

** Refers to Appendix filed in Third Circuit in Infringement Trial.

non-infringing processes (Weil, Tr. 3550; Herrmann, Tr. 5098-5102, 4972). Indeed, it would appear that between 1956 and 1959, the cost per bumper of soap and borax lubrication materials at Pontiac was slightly above the cost of Bonderlube 215 at Chevrolet-Livonia, and that between 1959 and 1963 the cost per bumper of soap and borax lubrication materials at Pontiac exceeded the cost of Montgomery DA 2481 at Chevrolet-Livonia (Cf. PX A-285-1 with PX A-285-2).

Except for a limited use of the Marproof or No-Mar process or certain bumpers during the 1956 model year from December 1956 through August 1963, Pontiac used soap and borax over phosphated steel (often with an additional drawing compound or a lubricant called Molykote) for 100% of its bumper production (APTO, P:7, 9-10; Herrmann, Tr. 4977-4979, 5056). The evidence clearly shows that the reason was the superior performance of Henricks-type lubricants as compared to non-infringing substitutes.

After testing various draw compounds in 1957 including Bonderlube 215 and Montgomery DU 1101 (both without inorganic compounds), Pontiac concluded that Bonderlube 246 (15% borax) "has proven the most satisfactory" for its use (PX A-287; Herrmann, Tr. 5017-5018, 5024; DX A-28-2).

After Pontiac tested Montgomery 2481, it continued to use Bonderlube 249A (APTO, P:9; Herrmann, Tr. 5015). Lubricity was an important consideration in choosing the coating material. One material tested was not slipping out from under the pressure pads and it would cause a break in the metal (Herrmann, Tr. 5017-5018).*

It was Pontiac's general experience that there are differences in the draw characteristics of different draw com-

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* The Henricks coating was not causing breakage. It was the steel and Pontiac's Lab so reported (Herrmann, Tr. 5072-5073).

pounds. "[Y]ou cannot put in a change of dies to accommodate the coatings . . ." At the start of the model year it must be decided which lubricant will be used for a given model, because "you can't run a set of dies on a trial . . . so once you start on a coating you are . . . stuck with it . . . [f]or the duration of the model [year]" unless there exists a very similar substitute (Herrmann, Tr. 4996-4997).

Between August 1968 to August 1969, Production Finishing used Non-Accused Practice PP (Bruce's Bruko 27B soap-only over phosphate) to precoat steel furnished by Great Lakes for Pontiac (APTO, P:15). Jones and Laughlin also furnished precoated steel to Pontiac using Bonderlube 243 over phosphate during the 1969 model year in Non-Accused Process OO (APTO, P:4, 12-13).

In summary (except for limited parts made by a non-infringing practice during the balance of the 1956 model year), Pontiac used the Henricks process as its lubricating system for 100% of its bumpers manufactured from December 1955 through the 1968 model year (APTO, P:2-4). The fair inference is that Pontiac found the Henricks process was satisfactory for its bumper manufacturing operating during that period, and was superior for its purposes to the existing non-infringing practices.* I find that to be the fact.

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* But not indispensable. Plaintiffs press for a finding that Pontiac could not manufacture its bumper bomb guards called "Dagmars" without the Henricks process. The evidence plaintiffs rely on is a report concerning the Pontiac bumper bomb guard called "Dagmars" which involved an extremely severe draw, and in which Parker Rust Proof's field man, Mr. Stump, reported that:

> "He [GM Engineer E. Waleryck] told me they [GM] can't do this job without Bonderite & Bonderlube & it is being laid out that way." (PX 86; Vol. 2:86).

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As with Chevrolet, plaintiffs argue that but for Pontiac's use of the Henricks process Pontiac bumpers would have required formation by hot forging or, if cold formed, could not have been flat-polished. I disagree.

While Pontiac felt the Henricks process did a better job than any non-infringing alternative, it does not follow that without Henricks Pontiac would have found itself unable to cold form bumpers, flat-polishing the blank sheet prior to deformation. Henricks' lubricants came to be regarded by Pontiac as more satisfactory, but others would have done the job. On this point it is topical to advert to the testimony of William L. Herrmann. Mr. Herrmann was a senior process engineer at Pontiac, responsible for flat polishing and coating of bumpers (Herrmann, Tr. 4954-4955). He was a credible witness. Mr. Herrman explained that Pontiac was aware of the Oldsmobile and Chevrolet processes, but decided to try to get better results than they had (Herrmann, Tr. 4989). Its experiments resulted in the switch to BL 246 (soap and borax). Mr. Herrmann summed it up this way;

> "The conclusion that we [at Pontiac] reached was in general that they [other lubricants] were not satisfactory for our use, but it didn't mean that we couldn't have used them, but it did mean that with our equipment, with our type of steel, with our ap-

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The writing is double hearsay, neither Mr. Stump nor Mr. Waleryck being available to explain whether the "Bonderlube" referred to was of a type with or without borax or why the lubricant (whatever its content) was especially needed. I will not infer from this fragment of evidence in the shape of a report from one Parker employee to another respecting a customer's planned product use, that General Motors could not make "Dagmars" except by the use of the Henricks process.

> plication, . . . and with our dies as they were, the [BL] 246 was the best material for our use." (Herrmann, Tr. 4989-4990.)

Pontiac liked the Henricks process. It was the first lubricant Pontiac used when it abandoned the messy Marproof lubrication. Pontiac held fast to it after the patent was validated, although substituting for what had been the borax inorganic what I have found to be a TKPP equivalent. Pontiac did not switch out of Henricks until 1968, near the end of the patent's term. And when it did so by the adoption of Non-Accused Practice OO (APTO, P:4), it came to use the Jones and Laughlin Surfa-Glaze steel with special qualities for bumper making. Negotiators for defendant seeking a license would have foreseen the strong preference by Pontiac's production people for the Henricks process. And reasonable negotiators for the patentee would have wanted to come to a royalty rate which would encourage Pontiac to use the process rather than switching over to a non-infringing alternative.

(d) Cadillac Bumpers

From 1952 through the 1958 model year, Cadillac cold formed the outer face bumper parts, only, from steel sheets without flat polishing (APTO, CAD:2). A wet lube was applied to the bare steel at the press; after forming, the parts were cleaned and then polished as necessary (APTO, CAD:2).

During the 1961 model year Cadillac cold formed all of its outer face bumper bars using Non-Accused Practice F, *i.e.*, a wet pigmented drawing compound over bare cold rolled steel; after forming, the parts were cleaned and then polished as necessary (APTO, CAD:3-2).

Before switching to the Henricks process "Cadillac was looking for a perfect finish over the entire bumper" and for that reason most of its operations "were not automated" but

were, unlike anybody else's at the time, "all hand operations" (Sukes, Tr. 2998).

Cadillac switched to the Henricks process in the 1962 model year and utilized it through the 1968 model year (APTO, CAD: 2-5). Thereafter Henricks contributed to benefits in the form of better appearance (Sukes, Tr. 2996-2997), less spot polishing (Priebe, Tr. 3007, 3010), more satisfactory plating (Sukes, Tr. 3001), less rejects (Priebe, Tr. 3007-3008; Sukes, Tr. 3002), and a generally less messy and cleaner production line (Priebe, Tr. 3006; Sukes Tr. 2997, 3000).

From about July-August 1968 onward, Cadillac used Non-Accused Practices C and D consisting of J&L and Great Lakes precoated phosphate and soap-only steel (APTO, CAD:1).

Since Cadillac used the Henricks process as its lubricating system for 100 percent of its bumpers manufactured from the 1962 model year through the 1968 model year (except for limited parts made by a non-infringing practice during that period) (APTO, CAD:3-7), the fair inference is that the Henricks process was more satisfactory for Cadillac's bumper manufacturing operation during that period than non-infringing alternatives.

As with Chevrolet and Pontiac, plaintiffs urge that Cadillac bumpers could not have been flat polished and cold formed without the Henricks process. For reasons previously stated I disagree, and believe that the negotiators would view Cadillac as they would view Chevrolet and Pontiac. The Henricks process was preferred from the 1962 model year to 1968. It did the job, and Cadillac was pleased with it. The negotiators would, therefore, have approached the royalty bargaining with Cadillac willing to pay for the privilege of using the Henricks process, and the patentee seeking a rate which would encourage Cadillac to do so.

(e) Fisher Body — Elyria Bumper Parts

Boiling down the information at APTO, FB:1-5, it appears that from at least 1952, Fisher Body Division — Elyria was cold forming flat-polished steel using Bruko D-9 or Kerns DF 4800 (soap and 68 percent borax, PX A-2a) over bare steel. In 1954 Fisher Body — Elyria added the step of flat polishing the steel before applying the lubricant. The processes used from 1952 to April, 1957 are not accused.

Infringing Practice 36 ran from April 1957 through March 1960. It infringed because it added to the cold forming operation a dip in a borax-containing lubricant. On March 31, 1960, Fisher Body — Elyria discontinued using a phosphate coating and applied the soap and borax lubricant to the flat-polished bare steel. Sometime after November 1962 Fisher Body — Elyria discontinued the use of flat polishing and the use of soap and borax dry film lubricant. Since that time Fisher has applied wet lubricants over bare unpolished steel before cold forming the bumper parts it makes.

Unlike the experience at Chevrolet, Pontiac and Cadillac, where there was evidence of either problem-solving or tangible advantage coincident with the adoption of the Henricks process, the record is vacant as to specific benefits achieved during Fisher Body — Elyria's relatively short use of it. Nevertheless I infer that for the period April 1957 through March 1960 the Henricks process was used because it was thought advantageous. This is the logical, if not the only, inference, absent any evidence from defendant to the contrary.

3. The Usefulness of the Henricks Process in the Making of Non-Bumper Extruded Parts

As with bumpers, plaintiffs argue that but for Henricks, non-bumper parts could not have been extruded. But instead of computing the sales of those parts produced by Henricks,

and applying to the sales figure a per cent royalty, they use as their "royalty base" the savings and gains which they attribute to Henricks when compared with the cost of cold forming or machining the same non-bumper parts.

The risk in plaintiffs' approach has been earlier noted. For bumpers plaintiffs applied a proposed royalty percentage to dollar sales. This permitted a fall-back to a lower percentage if plaintiffs' main submission (that cold forming could only be accomplished by Henricks) were rejected. But for non-bumper parts, no back-up position was supplied. Plaintiffs elected to put all their eggs in one basket, at the bottom of which is the premise that defendant's choice was between cold forming non-bumper parts through Henricks, or not cold forming at all. By computing their royalty claim on a percentage of savings and gains solely on the premise that cold forming could not be accomplished without Henricks, with the failure of the premise the bottom drops out of their savings and gains claim. And there is no secondary position justified by the evidence.

Where the royalty is based upon sales, the "essentiality" of the Henricks process becomes a factor which influences the amount of the royalty percentage, rather than being a *sine qua non* to any royalty award. If the negotiators found that the royalty of 2.4 percent of bumper sales sought by the patentee was too high because the Henricks process was not essential, they could (and would) still take into account the other merits of the patent and its value to the defendant in arriving at a compromise percentage figure. *Cf.*, *Randolph Laboratories v. Specialties Development Corp.*, 213 F.2d 873 (3d Cir. 1954). But that choice is not available where the only proofs relate to savings and gains which themselves would be non-existent if their premise is found to be false.

And false it is. For I find the fact to be that non-bumper parts could be and very often were, cold formed by defendant

without the use of Henricks. Indeed the question does not even seem to me to be a close one. The evidence is that, far from dominating the field, the Henricks process had relatively slight importance to defendant in the production of non-bumper extruded parts.

The Henricks process developed an allegiance in bumper making which it was never to find in extruded parts. Once used to form bumpers, the divisions employing it were reluctant to switch. Thus, there emerged a detectable pattern at the major infringing divisions (Chevrolet, Pontiac and Cadillac) of the use of borax in bumper production until validity was determined, and then of TKPP, for long periods without substantial change.

However, the experience of these divisions in the production of extruded parts is much more of a mixed bag.

(a) Chevrolet — Bay City

Infringing Practice 7 was used from May 1962 through July 1966 for the forming of steering knuckle and other parts by the use still received from suppliers pre-coated with BL 235 (the prior trial lubricant) or BL 239 over phosphate (APTO, CBC:1). The selfsame parts were thereafter made by Non-Infringing Practice 8 which used neither borax nor a borax equivalent. (See pages 55-56, *supra*; also, Non-Accused Practice E, APTO, CBC:1, 8). There is nothing to show that the changeover was other than routine, or that the non-infringing alternatives could not have been used from the beginning.

(b) Chevrolet — Buffalo

Infringing Practice 9 ran from July 1959 to July 1962 at Chevrolet's Buffalo plant. It involved the forming of Pitman arm ball stud seats from blanks furnished by Republic Steel and precoated by that manufacturer with BL 235 (the prior

trial borax lubricant) or BL 239 over phosphate (APTO, CD:1-3). The use of the lubricant was limited in time and isolated.

(c) Chevrolet — Parma

Infringing Practice 16 (APTO, CP:1) saw the making of shafts and levers at Chevrolet's Parma plant with the help of a borax-containing lubricant from July 1963 through March 1969. While that is a durable use of Henricks, Chevrolet — Parma's movement from Infringing Practice 17 to Non-Infringing Practice 18, to Non-Accused Practices K and L (*Ibid.*) runs counter to claims of high value for the patent in non-bumper extrusions. Infringing Practice 17 involved the use of a borax-containing lubricant from 1957 — May 1963 to make universal joint bearing races and propeller shaft ends. Next came Non-Infringing Practice 18 from May 1963 through May 1964, whereby the borax lubricant was abandoned in favor of a soap-only lubricant with a borax neutralizing rinse. Then from May 1964 through October 1968 the borax neutralizer was eliminated from the rinse (Non-Accused Practices K and L). So, while the stability of the use of the Henricks process in Infringing Practice 16 suggests that the borax lubricant was favored, the apparent ease of shifting from an infringing practice to non-infringing practices suggests the opposite.

(d) Delco Electronics

Although Infringing Practice 22 is next numerically, chronologically it was the first of the accused practices. It involved the use of a borax lubricant to make rocket fuse housings and booster cups from August 1952 to February 1954 at Delco Electronics (APTO, DE:1). Except for this instance, there is no charge that Delco Electronics utilized the Henricks process for cold forming. One cannot deduce from Infringing Practice 22 a passion for the Henricks process.

(e) Delco Products

The only process accused at defendant's Delco Products Division is (partly) Infringing Practice 25. It saw the formation of studs and rings from July 1962 — July 1966 with the help of a borax lubricant (APTO, DP:1). The identical parts were made thereafter without the introduction of borax (Non-Accused Practices T and U) (APTO, DP:1, 2). Again the restricted use of the Henricks process at Delco Products, and the evident ease of moving out of it, counter-indicate a high degree of need for the process.

(f) Delco Remy

The division making the most extensive use of the Henricks process was Delco Remy. Infringing Practices 26, 27, 28, 30, and 31 — five of the total of 17 non-bumper processes required to be held infringing by the law of the case — occurred there (APTO, DR:1-2). Yet even Delco Remy seemed to have no trouble moving in and out of borax-containing lubricants. By Non-Accused Practices W, X, Y, and Z (APTO, DR:2-3), the selfsame parts produced by the infringing processes were made without the use of Henricks lubricants.

(g) Diesel Equipment

The only infringing practice at defendant's Diesel Equipment Division is the prior trial practice of making hydraulic valve lifter plungers from 1955 — third quarter of 1958. It is an isolated use (APTO, DE:1).

(h) Fisher Body-Columbus

At Fisher Body-Columbus, Non-Infringing (because cleaning advantage was not used or shown) Practice 33 was used to make window regulator bearing studs and door lock striker pins from 1963 — January 1964. Thereafter some

parts were produced by Non-Infringing Practices 34 and 35 (using borax as a neutralizing rinse), Non-Accused Practice BB (eliminating the borax from the rinse), and Non-Accused Practice CC (lime coated steel) (APTO, FBC:1-8). There was no infringing use by this division.

(i) Inland Division

Infringing Practices 37 and 38 at the Inland Division were used to make ball joint sockets from 1959 – 1966 (APTO, ID:1). Thereafter a soap-only lubricant in Non-Accused Practice EE supplanted the soap and borax used in the infringing practices.

(j) Oldsmobile

Infringing Practice 42 saw the production at Oldsmobile of rocket cones called ogives, and rocket body parts, with the help of a borax lubricant from June 1953 – January 1954 (APTO, O:1). Before this non-borax lubricants were used (Non-Accused Practices II and JJ) (APTO, D:2). Like Delco Electronic's wartime use of Infringing Practice 22, Oldsmobile's short use of the Henricks lubricant does not prove much about its worth.

(k) Pontiac

Pontiac was also in the rocket-making business, using the prior trial BL 235 infringing practice in 1952 and 1953 to make rocket bodies and heads (APTO, P:1). Infringing Practice 47 was the 1954 successor to the prior trial infringing process. These were the only non-bumper practices held to infringe at Pontiac, and their use was of limited duration.

(l) Saginaw Steering

Finally, Saginaw Steering Gear, in Infringing Practices 54 and 56, did use borax-containing lubricants (PX A-2a) to

produce various parts (APTO, SSG:1). Infringing Practice 54, used to make ball joint studs until March 1967, was abandoned in favor of Non-Infringing Practice 55 (borax neutralizer) (APTO, SSG:1). While Infringing Practice 54 was being used, a large fraction of Saginaw's ball joint studs were produced, without apparent difficulty, by Non-Accused Practice RR (APTO, SSG:3 and 27, fn.). Infringing Practice 56 was used to make multiple parts, mostly from 1958 — 1962, many of which were later made by Non-Infringing Practice 57 (borax neutralizer).

* * *

Any but the most fervent advocate would conclude from reviewing the pattern of defendant's non-bumper infringements that Henricks was not the only way it could, and did, cold form parts.

As in other areas of damage law it is of course the case that where a reasonable royalty cannot be precisely proved a fair approximation based on the evidence will suffice. *Faulkner v. Gibbs*, 199 F.2d 635, 639-40 (9th Cir. 1952). However, the proof must be based upon creditable data, not speculation, conjecture or unwarranted assumptions. *Trio Process Corp. v. L. Goldstein's Sons, Inc.*, 533 F.2d 126, 130 (3d Cir. 1976); *Rude v. Wescott*, 130 U.S. 152, 166-167 (1889); *Boesch v. Graff*, 133 U.S. 697, 706 (1890); *Panduit Corp. v. Stahlin Bros. Fibre Works*, 575 F.2d 1152-1162 (6th Cir. 1978). As stated by the Supreme Court in *Rude v. Wescott, supra*, 132 U.S. at 167:

> " . . . [N]o evidence of the value of the invention to the defendants was adduced except the conjectured estimates stated; they furnished no satisfactory basis for any damages, much less data, which authorized the specific finding made as to the damages for each drill used. Opinions not founded on knowledge

> were of no value. Conclusions from such opinions were at best mere guesses. By the decision rendered, a settled rule of law was violated, that actual, not speculative damages, must be shown; and by clear and definite proof, to warrant a recovery for the infringement of a patent . . . "

By relying in their savings-and-gains proof solely on the (erroneous, as I have found) premise that defendant could have cold formed non-bumper parts only through Henricks, plaintiffs have offered no evidence on which a royalty might be reasonably based.

In so concluding I should straight-out say that I am acutely mindful that in a case of this duration every effort should be made to find a way to allow a patentee fair compensation for infringements it has fought so hard to sustain. And I should indicate that in other circumstances I would be left with a sense of malaise at finding no basis in the evidence to sustain an award for non-bumper infringements. But such uneasiness as I might otherwise have felt on the point is softened by the conviction that the usefulness of Henricks in the production of non-bumper parts was relatively minor, and by the decision to give some degree of consideration (albeit not in a quantified way) to the non-bumper infringements in the course of the hypothetical negotiations which come later.*

4. Defendant Used Borax and TKPP in Bumper-Making to Improve the Lubricant, Not Because Those Substances Cost Less than Soap.

Although what is covered here could have been, and to some degree was, discussed in the context of the usefulness of

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* See page 139, *infra*.

Henricks in bumper making, it is made the subject of a separate section to avoid submerging an important issue toward which the parties have directed special attention. The controversy comes about the the following way.

To undercut the value to be accorded by the negotiators to the usefulness of the Henricks process in bumper manufacture, defendant suggests that borax was inserted in its bumper lubricants because borax cost less than soap. It will be remembered that in making non-bumper parts, the amount of borax used by defendant in the lubricant was quite small, and that defendant has from the beginning argued that the borax was inserted as a neutralizer only. Although under the law of the case such lubricants nevertheless infringe, the relatively slight usefulness of the Henricks process in the extrusion of non-bumper parts, and plaintiffs' inability to prove damages as the result of those infringements, do tend to support the notion that the borax in low-borax lubricants was of only small significance in the lubricating process.

But the opposite reasoning applies to bumpers. There relatively large amounts of borax, and later TKPP, were used along with soap to form the lubricant. That being the case, common sense requires the inference, absent a better alternative explanation, that the very purpose of the borax and TKPP was to improve the lubricant. Not insensitive to this problem, defendant seeks to explain the use of large amounts of borax and TKPP in bumper manufacture by suggesting that these inorganics were inserted in the bumper lubricants because they were cheaper than soap. That position is contrary to the evidence, and I reject it.

The only witness defendant was able to find to testify that a switch to a borax-containing lubricant (Kerns 3833) from soap only (BL 215) was made for reasons of cost savings was John J. Kary (Kary, Tr. 7461-7464, 7490). Kary mitigated his testimony on cross-examination (Kary, Tr. 7597-7598). But

to the extent this testimony supports defendant's argument that Chevrolet switched from soap to soap and borax because the latter was cheaper,* I explicitly reject that testimony.

First, witness after witness testified that cost was not significant in selecting a lubricant (Weil, Tr. 3550; Herrmann, Tr. 5098-5103, 4972; Wojtowicz, Tr. 5711-5714; Kary, Tr. 7503-A). There is sense to this, because the lubricant cost is a relatively infinitesimal factor in bumper production. For example the cost of lubricant for annually producing tens of millions of dollars worth of bumpers at Chevrolet was in the neighborhood of $24,000 per year (Kary, Tr. 7598).

Second, Chevrolet never ran any cost studies to determine lubricant costs per bumper (Kary, Tr. 7490) and Kary was unfamiliar with the cost of lubricants used by other bumper plants (Kary, Tr. 7541-7542). If cost of the chemicals had been an important consideration, those costs at other divisions would have been considered.

Third, Mr. Kary's testimony that Chevrolet-Livonia stopped using Bruko 27 soap-only because the Bruko sales people were not aggressive and did not come around to sell the material to Chevrolet-Livonia, is inconsistent with other record evidence (Kary, Tr. 7504-7507; DX A-25), and inconsistent with the "second source" policy upon which he said he relied in earlier trying Montgomery DA 2481 (Kary, Tr. 7465). I believe, and find, that had the Bruko soapy lubricant been as satisfactory as the Bonderlube TKPP lubricant, its use would have been continued.

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* "Chevrolet was not required to go to soap and borax at all. Kary simply wanted to save part of the cost of the lubricant itself. Kary Tr. 7463-4." (Defendant's Comment to Plaintiffs' Proposed Fact Finding 231; also 267, 268).

Fourth, no witness testified that TKPP was cheaper than soap. To the contrary, there was evidence that at Chevrolet the use of TKPP-containing BL 200 was *more* costly than soap-only, or soap and borax (PX A-285-2).

Large amounts of borax and TKPP were used by defendant in its bumper manufacture. Defendant's explanation that the selection of these inorganics was to save lubricant cost is contrived. Indeed the very weakness of its explanation confirms the conclusion that Henricks lubricants were selected by defendant only because they supplied advantages in the production of bumpers.

5. Declination to Treat as Controlling in Fixing a Royalty Certain Transactions Relied on by Defendant

Defendant urges that various of plaintiffs' patent transactions indicate a ceiling for the worth of the Henricks patent. Its contentions will be considered *seriatim*.

(a) The Transfers of Interest in the Patent in 1955 and 1965

On September 10, 1955, Devex assigned the Henricks patent in suit to Messrs. McCoy and TeGrotenhuis* (DX A-1, Item 2). Defendant points out that in effect this agreement valued the patent at $100,000. It urges this a factor to be given controlling, or at least substantial, weight in fixing a royalty now.

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* TeGrotenhuis had worked as an attorney on the patent application (Tr. 4824-4825). He and McCoy were also minority stockholders in Devex (Tr. 4828-4829). He and McCoy prepared the agreement (DX A-1, Item 1). Henricks was then President of Devex and recommended the agreement (*Id.*).

Defendant further contends that plaintiffs in effect assigned a value to the validated patent in 1964, when a one-third interest in the patent (then subject to the exclusive license to Technograph) was sold to sophisticated and knowledgeable lawyers for $50,000, subject to an earlier created right in another (DX A-1, Item 33, last three pages; Tr. 8167-8169). It suggests that this supports a conclusion that the patent had no great worth, since it shows a market price for the patent overall at under $200,000 (DX A-1, Item 3, Article 3(b)).

I do not accept defendant's contention that the conduct of plaintiffs in their *inter sese* dealings respecting the patent should be given significant weight here, much less that it puts a ceiling on the royalty that can be awarded.

The order of the day in this phase of the accounting is to construct hypothetical negotiations to determine a reasonable royalty. It does not advance this endeavor to suggest that plaintiffs are, as defendant has somewhat perjoratively styled them, "patent speculators." True, the interests plaintiffs represent were not acquired with the idea of practicing the invention, but with the purpose of profitting from the business of licensing it. But nothing in the logic of the statute, or any law to which defendant has called attention, suggests that a person who buys an interest in a patent should for that reason receive less from the infringer than the far-sighted genius who conceives the invention, patents it, and then himself licenses it, or who transfers it to the "speculator" at what turns out to be a bargain price. Neither logic nor authority suggests that a "reasonable" royalty should vary depending on the identity of the patent owner or whether he paid fair value for his interest.

A look at the flip side of the argument defendant has coined tends to support this conclusion. If plaintiffs had demonstrably paid for the patent the hundreds of millions of dollars they now seek, defendant would not sanguinely allow

that fact to create a "floor" below which a reasonable royalty could not descend. It would urge that what they paid was an irrelevancy, and that the true endeavor is to allow plaintiffs a fair share of the value of its wrongful use, be that amount great or trivial. That is the only sensible rule.

In so concluding, note should be taken of one very recent decision, relied on by defendant. *Ellipse Corporation v. Ford Motor Company,* 461 F.Supp. 1354, 1361-1362 (N.D. Ill. 1978). There the Court did remark at various transactions, for relatively small sums, in the stock of plaintiff-patentee. Having done so, it observed:

> "Ellipse now proposes the court enter a $55,476,843 judgment against Ford for reasonable royalty under its profit theory plus $41,401,257.90 in interest, or a total just under $97,000,000. This would be a huge windfall on the stockholders' comparatively small investment. It would be grossly unfair under the circumstances of this case to make such an award of damages, plus interest, and grossly unfair to the thousands of stockholders of Ford Motor Company who have invested millions of dollars in the production of automobiles and have contributed to the social and economic development of this nation and the world. Such an award would be inequitable and indefensible both in equity and law under all the circumstances of this case."

Without in any way meaning to disrespect the *Ellipse* Court, having commented on the size of plaintiff's claim when compared with the investment of its stockholders, the Court in no way explains how that investment is legally material to the royalty issue. To the contrary, the decision proceeds after detailed analysis to award damages measured by a reasonable royalty of $656,820.30 based on familiar standards.

In a human sense, of course, there may be a tendency toward irritation at a plaintiff which seeks amounts far in excess of what it can reasonably hope to achieve. I do not suggest that *Ellipse* vents that emotion, since the smallness-of-the-investment against the size-of-the-claim language may well have served some other purpose. But whatever purpose, it is clear that *Ellipse* did not view it as legally material to the reasonable royalty. Neither do I.

(b) The Value Put on the Patent by One of the Owners for Estate Tax Purposes

In this same vein defendant submits (Def. Br., II-K-16; Def. Proposed Finding K-10) that a comparable evaluation of the total worth of the patent ownership occurred in 1970 before knowledge of Judge Wright's decision (DX A-48a, p.3) when William McCoy, Jr., valued his father's one-ninth interest in the patent at $15,000 for Federal Estate Tax purposes (DX A-48, Orig. Ans. to Interrog. A-7c, Item 19, p. 5; DX A-48A, January 1979 amended Ans. to Interrog. A-7c). While the calculation is made more complicated, by reason of other interests, than simply multiplying 9 × $15,000, in rough terms defendant contends (and it is not disputed) that if the McCoy estate tax calculation were binding on plaintiffs it would value the patent at in the neighborhood of $150,000. Defendant seeks to limit plaintiffs to that figure.

Defendant's contention is rejected. If the transfer prices of patent interests are (as I have found in this case) not weighty, then the valuation of the fractional interest of one of the patent owners for estate tax purposes would seem even less significant in fixing a reasonable royalty.

(c) Settlements by Plaintiffs

In 1968 and after a total of nineteen lump-sum settlement agreements were negotiated for amounts ranging from

$2,500 to $250,000 (DX A-1, p.6). The settlements covered damages for past infringement, and those settlements negotiated prior to patent expiration had the effect of licensing all future usage (*e.g.*, DX A-1, Item 20 — Houdaille dismissal). Defendant seeks the benefit of those settlements. (See Def. Proposed Finding K-11.)

Defendant's argument on this point is directly contrary to the holding of the Supreme Court in *Rude v. Wescott*, 130 U.S. 152, 164 (1889). Age has not dulled the sharp reasoning of that decision. Rejecting a master's reliance on payments under threat of suit as proof of damages, the Court observed:

> " . . . It is clear that a payment of any sum in settlement of a claim for an alleged infringement cannot be taken as a standard to measure the value of the improvements patented, in determining the damage sustained by the owners of the patent in other cases of infringement. Many considerations other than the value of the improvements patented may induce the payment in such cases. The avoidance of the risk and expense of litigation will always be a potential motive for a settlement. . . . ."

Here the record is barren of details respecting the factual backdrop of the settlements on which defendant seeks to rely, or why they would be reliably indicative of the value of a reasonable royalty. Since no showing has been made as to how or why plaintiffs' rapprochement with other putative infringers should elude *Rude's* proscription, no weight will be accorded them.

(d) The Formea "License"

Next defendant urges that plaintiffs' licensing efforts and transactions further demonstrate the limited value of a license under the Henricks patent.

In the 1956-57 period, McCoy, Sr. and TeGrotenhuis offered licenses to Houdaille (TeGrotenhuis, Tr. 4864-4865), Standard Steel Spring (Tr. 4881-4882), Pennsylvania Salt (Tr. 4900-4906), and Borg Warner (DX A-37, letter of May 23, 1957). The royalty base was pounds of phosphate, and the only royalty amount stated was two cents per pound. Formea Chemical Corporation either had a license (DX A-6, Item 4; DX A-37, Item 1) at one percent per pound of phosphate (PX A-6, Item 3) or had a binding commitment for the grant of such a license (TeGrotenhuis, Tr. 4840-4849, 4869, 4877).

Relying upon these facts, defendant cites the rule that the patent transactions of the patentee, including patent licenses, license offers, sales and other transactions placing a value on the patent are appropriate considerations in determining the reasonable royalty. *Trio Process Corp. v. L. Goldstein's Sons*, 533 F.2d 126, 129 (3d Cir. 1976); *Randolph Laboratories v. Specialties Development*, 213 F.2d 873, 874-875 (3d Cir. 1954); *Minnesota Mining v. Berwick Industries*, 393 F.Supp. 1230, 1245 (M.D.Pa. 1975), *aff'd*, 532 F.2d 330 (3d Cir. 1976); *General Motors v. Dailey*, 93 F.2d 938, 940 (6th Cir. 1937). It concludes that plaintiffs' licensing efforts and lawsuit settlements in combination with the evidence of their own valuation of the patent in purchases and sales of patent interests and for tax purposes, operate to put a low ceiling on a "reasonable" royalty here (Def. Br., II-K-3 thru 12).

Again, I disagree. While it is clearly the law that an established royalty is strongly material in judicially settling on a post-infringement reasonable royalty, here the license arguably given the Formea Corporation did not create an established royalty. That company was largely owned and controlled by McCoy and TeGrotenhuis who also then owned the patent (TeGrotenhuis, Tr. 4834, 4893). The effort was to vitalize Formea by getting it into the phosphate selling

business through the mechanism of sublicensing its hoped-for customers under the Henricks patent (*Id.* at 4843-4845, 4892-4893). There were no sales of phosphate, and no sublicenses (Def. Br. II-K-12; Tr. 2417). Indeed, it is not even certain that Formea ever formally obtained rights under the Henricks patent (*Id.* at 4843-4845). The reason for the lack of success in licensing was that the patented process was being openly used in the metal-working industry without regard to plaintiffs' rights (TeGrotenhuis, Tr. 4862-4863). These facts fall far short of proving an established royalty. *Faulkner v. Gibbs,* 199 F.2d 635, 638-639 (9th Cir. 1952).

Under such circumstances I decline to give weight to the Formea "license" as bearing on the reasonable royalty to be awarded here.

6. The Royalty Base

Based upon plaintiffs' unsuccessful feint at licensing the patented process based on pounds of phosphate sold by Formea, defendant concludes that the proper basis for measuring a reasonable royalty would be pounds of phosphate used to undercoat the lubricant. (Defendant argues for a penny or two a pound.) (See, Def. Br. II-K-32.)

For the reasons earlier stated, I decline to give any weight to plaintiffs' abortive effort to license the patent on a distress basis while it was being openly ignored by industry based upon the apparent wide belief that it was invalid. See *Trio Process Corp. v. L. Goldstein's Sons, supra; Faulkner v. Gibbs,* 199 F.2d 635 (9th Cir. 1952). Further, I am of the view that the application of a penny figure to pounds of phosphate would not be the approach taken by reasonable negotiators, for it bears no relationship to the value of the patented process. To the contrary, it is an arbitrary selection which might represent a bail-out effort by patent owners trying to salvage a

modicum of value from a patent in disrepute, but not a rational basis on which to license a validated patent.

While not uniformly accepting their testimonial advocacy, on this issue I think plaintiffs' trial experts, George Church and Richard Whiting, have the better approach. In suggesting a reasonable royalty for bumpers, they applied a percentage to sales prices (Church, Tr. 1924-1925; Whiting, Tr. 2656-2657). For reasons which will soon appear I do not accept their percentages. However, their concept of using a percent of sales prices as a royalty base makes sense. It is not unprecedented. See, *e.g.*, *Randolph Laboratories v. Specialties Development Corp., supra; Hartford National Bank & Trust Co. v. E.F. Drew & Co.*, 188 F.Supp. 353 (D. Del. 1960), *aff'd*, 290 F.2d 589 (3d Cir. 1961), *cert. den.*, 368 U.S. 825 (1961). And it gives the patentee a share of the value the use of the patent helped create.

I therefore conclude that a percent of sales price is the appropriate conceptual formulation for the determination of the reasonable royalty to which plaintiffs are entitled here.

7. The 1964 Offer to License

Stepping back for a moment, the statutory provision at 35 *U.S.C.* § 284 requires the award of damages " . . . in no event less than a reasonable royalty. . . ." And the willing-buyer/willing-seller test requires the hypothesis of negotiations such as would lead to that royalty.

In groping toward what royalty would be reasonable, the courts have uniformly indicated that weight should be given to royalty arrangements established between the patentee and third persons in respect of the invention. *Faulkner v. Gibbs*, 199 F.2d 635, 638-639 (9th Cir. 1952); *Union Carbide Corporation v. Graver Tank & Mfg. Co.*, 282 F.2d 653, 668-669 (7th Cir. 1960), *cert. den.*, 365 U.S. 812 (1961); *Marvel*

Specialty Company v. Bell Hosiery Mills, 386 F.2d 287, 290 (4th Cir. 1967), *cert. den.*, 390 U.S. 1030 (1968); *Carter Products, Inc. v. Colgate-Palmolive Company,* 214 F.Supp. 383, 393 (D. Md. 1963); *Amerace Esna Corporation v. United States,* 462 F.2d 1377, 1380 (Ct.Cl. 1972). While the reasonable royalty rate may be set at above the established royalty, as where the established royalty is artificially depressed by defendant's own ongoing infringement, *Trio Process Corp. v. L. Goldstein's Sons, Inc.*, 533 F.2d 126, 129 (3d Cir. 1976), absent such special circumstances the rate " . . . established in this industry as a reasonable royalty . . . " has been accorded great deference. *Randolph Laboratories v. Specialties Development Corp.*, 213 F.2d 873, 875 (3d Cir. 1954).

For reasons previously expressed, in fixing a royalty I have determined not to give weight to various of the transactions concerning the patent argued by defendant as setting a low ceiling. Prices contracted for interests in the patent, the McCoy estate tax valuations, settlements entered into with alleged infringers, and the early Formea arrangement were all found to be of little or no evidential use. They do not prove an established royalty, and I have found that they provide no guidance to hypothetical negotiators.

There is, however, evidence of a different cut.

Starting in November 1964, plaintiffs submitted a proposed form of license (DX A-66a), to each and every company it thought was using the teaching of the Henricks patent (Shortt, Tr. 2144, 2413-2415). The license offer provided for a royalty based on three-fourths of one per cent (.75%) of the net purchasing or sale price of the item so produced, or one per cent (1%) of manufactured cost (DX A-66(a)).

The importance of plaintiffs' offer to license is underscored by its timing. The offer was made in November 1964, and

came just ten months after the validation of the patent by the declination of the United States Supreme Court to grant review. (Certiorari was denied on January 6, 1964. 375 U.S. 971.) Plaintiffs were then on top. If their offer had been universally accepted, it would have resulted in an "established royalty," the existence of which would have made the task of this accounting considerably easier.

Plaintiffs make a point of the fact that their offer was accepted by no one. Indeed it was not. But the lesson to be drawn from this is not that the offer was too low. On the contrary, the fair deduction is that the offer to license for three-fourths per cent of sales (or one per cent of manufactured cost) in 1964 was universally rejected, because the offer was higher than users of the process were willing to accept. See, *Foster v. American Machine & Foundry Co.*, 492 F.2d 1317, 1322 (2d Cir. 1974); see also, *Amerace Esna Corporation v. United States, supra,* at 1379-1381.

As offers to sell have been held helpful in ascertaining fair market value based on willing-buyer/willing-seller principles in the real estate context, so offers to license have been held relevant in ascribing value to a patent. *Pitcairn v. United States,* 547 F.2d 1108, 1118 (Ct.Cl. 1976):

> "As for the offers not translated into actual agreements, the authorities which reject such use (see the cases cited in 4 *Nichols, Eminent Domain,* (3d ed. rev. 1975), §§ 12.311[2] and 12.3113[3]) concern attempts by the condemnee to seek a *higher* award on the basis of offers made by or to him (or to utilize a third-party offer with respect to comparable property to gain a *higher* award). They do not involve an effort by the condemnor to rely on an offer made *by* the condemnee as proof of the value of the property. It is obvious that, although the inherent defects of offers made by condemnee-owners

> prevent the opposite party, the condemnor, from being bound by such offers, there is no reason why the owner himself should not be held to his own offer. In this instance, the post-1946 offers were not casual or *ad hoc* but were circulated 'fairly widely' in the industry. It is appropriate to take them into account and to give them great weight." (Footnote omitted.)

The *Pitcairn* reasoning makes good sense. The establishment of a royalty such as would bear strongly on the hypothetical negotiations requires the coming together of a willing patentee with willing users of the patented process. Plaintiffs' broadly circulated offer to license at three-fourths of one percent of sales (representing what the then willing patentee would accept after the validity of the patent had been chiseled in stone) was the first step in that process. It will be given weight here.

E. The Hypothetical Negotiations

All of the foregoing constitutes the predicate and forms the groundwork for the hypothetical negotiations which would lead to a reasonable royalty. Since the negotiators would be aware of everything that has been found legally and factually in the Infringement section and the preceding parts of the Damages section, those findings and conclusions would have conditioned the bargaining. Taking that as given, and aiming to avoid useless repetition while at the same time saying enough to illuminate the negotiating process as it is hypothesized, I find the following to be the most likely scenario by which the suppositious negotiators would play out their parts.

1. Plaintiffs' opening gambit in the negotiations would be to claim a hefty per cent of bumper sales, based on the same evidence and arguments advanced at trial.

Plaintiffs' trial experts were George Church and Richard Whiting. Both were knowledgeable, experienced lawyers with good credentials in the area of patent license agreements. They figured five per cent of sales was a fair royalty rate for original equipment bumpers (Church, Tr. 1924-1925; Whiting, Tr. 2657).

But original equipment prices would have been hard to prove since bumpers are bolted to a vehicle which carries a single price tag. Hence, plaintiffs relied on dealer replacement (after-market) prices charged by defendant.* These would tend to be higher than original equipment cost of the bumper, had that cost been ascertainable. (The dealer shelf cost of the sum of the parts on an item-by-item basis is greater than the cost of the whole car.) Since plaintiffs sought a royalty in all bumper sales, but had only dealer replacement figures, they felt obliged to adjust their royalty demand downward. Church discounted his 5 per cent suggested reasonable royalty to 2.3 per cent because the sales price figures supplied by defendant were for sales by defendant to its dealers by way of replacement parts, whereas 90 per cent of defendant's actual sales would have been on an attached-to-the-new-car basis at a much lower mark-up (Church, Tr. 1925-1926). Whiting came down from a 5 per cent start to 2.5 per cent for somewhat similar reasons (Whiting, Tr. 2659-2663). Plaintiffs' percentage claim of 2.4 per cent at trial was the in-

* In view of the difficulty of valuing the bumper as an integral part of a new vehicle, plaintiffs' approach is sensible. Defendant argues that some of the bumpers sold to dealers were sold as assemblies which included in their price items, like brackets, not produced by any accused process. Had defendant offered evidence that tended to show specific deductions properly attributable to aggregate bumper sale prices on account of non-infringing parts, such evidence would certainly have been relevant. But this was not done. As the record now stands, defendant is left with what seems to be a carp at a defect it made no effort to correct.

between of these figures, and that is where plaintiffs' hypothetical bargainer would probably start (Pl. Br. pp. 85, 104).

But both of plaintiffs' experts gave no weight to non-infringing, non-accused alternative processes such as the Oldsmobile process and the early Chevrolet process (Church, Tr. 1949-1950); Whiting, Tr. 2793-2798). Their bullishness about the high value of the accused bumper processes was based on the assumption that the accused processes infringed, and other alternatives were ineffectual (Church, Tr. 1966-1967, 2004, 2089; Whiting Tr. 2812-2816). The negotiators, however, would recognize, as I have found, that Henricks was not essential to General Motors' bumper production.

Alternatives being available, and the patentee desiring to maximize defendant's use of the process so as to gain an optimum in license revenues, the negotiators would move to the discussion of a percentage less than 2.4%.

2. Next the bargainers would consider a royalty figure of three-fourths of one percent of bumper sales. This is what the patentee unsuccessfully sought to establish as a royalty in 1964, and for reasons previously explained, the figure would importantly figure in the bargaining. (See pp. 126-130, *supra*.)

3. Assuming (as I must since it is all the evidence we have) that the bargainers would have before them only dealer-price (and not OEM) bumper sales figures, the bargainers would go through the same discounting process as did Messrs. Church and Whiting in reducing the 5 per cent royalty percentage with which they began to 2.4 per cent which they urged as fair. Supposing, as I do, that what was thought by plaintiffs to be reasonable at trial would have been reasonable at the bargaining table, plaintiffs' negotiator would have reduced

his proposed royalty of three-fourths of one per cent, which would have been applicable had new car bumper prices been available, to a proportionately lower figure to account for the higher prices of dealer replacement bumpers.

The arithmetic would go this way: Plaintiffs' trial experts opined that the use of dealer equipment prices would justify a reasonable royalty of just under half (.48) of that which would have been reasonable had OEM prices been available (2.4% divided by 5% equals .48). This same discount would have been applicable to plaintiffs' 1964 request that industry pay it a royalty of .75% of sales prices, and would have resulted in plaintiffs' offer to license defendant's use for a royalty equal to .36 percent of dealer replacement sales (.48 times .75% equals .36%). That is what plaintiffs' bargainer would seek.

4. The parties would agree that .36 per cent was too high. It is the same, taking into account the reduction for the use of defendant's dealer price figures recognized by plaintiffs' experts at trial, as the .75 per cent offer which was agreeable to no user of the process even after the patent was validated, when it might have been expected that a reasonable offer to license would have at least provoked the interest of industry. But the negotiators would find that it was bringing them closer to agreement.

5. The negotiators would next try to develop parameters within which to closely bargain. In so doing plaintiffs' bargainer would try to strike a figure at which defendant would be encouraged to use the patented process, thus maximizing the return under the license. Defendant's negotiator, for his part, would strive for a figure which would enable it to practice the invention without the pressure of reaching out for non-infringing alternatives. In a sense, then, their endeavor would have broad common ground. Gifted by imputation with knowledge of the facts as I have found them, and ignoring none of them, the negotiators would probably emphasize:

(a) On the one hand, Oldsmobile's ability to produce bumpers without apparent difficulty during the entire life of the patent without the use of the invention, and the intermittent success experienced by defendant's other divisions in doing likewise.

(b) On the other hand, the strong allegiance of Chevrolet, Pontiac and Cadillac to the patented process, and its use at Fisher Body. The negotiators would find especially persuasive the decision by defendant's bumper makers after the patent was validated to try (unsuccessfully as it turned out) to avoid the patent by using TKPP instead of borax in their lubricants, rather than soap-only or the Oldsmobile process.

6. The negotiators would conclude that although defendant could cold form bumpers without the Henricks process, use of that process did have benefits and value which was not inconsiderable, and that certain of its divisions would abandon such use only with great reluctance. While this value would be difficult to quantify, involving as it does a combination of judgmental factors, the strength of the allegiance to Henricks would cause the negotiators to strike a compromise.

7. So guided by the sweet voice of logic the negotiators would strive to fix a range of reason, less than the percentage sought by the patentee but high enough to fairly compensate it, within which to peg the royalty. In striving for the proper range the bargainers would be mindful of their own fallibility, and the delicacy of the judgments involved. Their task would have been made easier had there been a true established royalty, widely accepted and untainted by claims of invalidity or non-infringement. Their concentration would have also centered on the dollars and cents of savings and gains, had they had such information in reliable form. Lacking this, they would do the best with what they had. On that basis, and on the facts and law previously developed, I find that the bargainers would have come to parameters of .18 per cent to

.24 per cent of General Motors dealer priced bumper sales as the lower and upper limits — or the equivalent of a half to two-thirds of the .36 per cent plaintiffs offered (taking this to be the same as their .75 per cent license proposal in 1964, for reasons previously explained).

In so concluding I should indicate that Judge Maris' opinion in *Randolph Laboratories v. Specialties Development Corp.*, 213 F.2d 873 (3d Cir. 1954), has provided special guidance. As here, that case had a long history. It returned to the Court of Appeals for the last time after one of plaintiff's patents (the Minor patent) had been held invalid, and the District Court has awarded a 7 per cent royalty on sales of products produced by use of a second patented invention (the Mapes patent).

The Court of Appeals reversed the 7 per cent award because the royalty set by the court below was based on the premise that the Mapes patent was dominating, a premise found by the Court of Appeals to be erroneous. Left with no royalty rate, and a case too long pending, the Court set about to find a reasonable royalty without remand. It did so in a short and sensible way. The Court noted that the Minor patent was believed to be dominant, and did have an established royalty of 3 per cent before its invalidation. It observed that the device taught by the Mapes patent was superior to its competition, but not dominant. The Court therefore concluded "... that damages [for infringement of Mapes] based upon a royalty of 2 per cent of total sales would be fair and just ...". 213 F.2d 875.

While this case is poles apart from *Randolph Laboratories* on its facts, there are congruities. In *Randolph* there was an established royalty for a patent thought to be dominant before its invalidation. Here plaintiffs by their 1964 offer to license sought to establish a royalty for a patent which they contended was dominant. In *Randolph* the Court itself set the

royalty for a related patent found to be advantageous, but not dominant, at a major fraction (2% vs. 3%) of the established royalty for the dominant patent. It did so in tune with its notions of fairness and justice. Here I have found that the Henricks process was advantageous but not dominant. And I have concluded that the range of royalties within which the hypothetical negotiators would finally bargain would be a half to two-thirds of the .36 per cent plaintiffs offered (the dealer price equivalent to their .75% offer) at a time they believed that their patent was dominant (indeed, a *sine qua non*) in bumper cold forming.

The approach taken by the bargainers in the negotiations hypothesized here (based on the facts and law earlier found) is far more detailed than was possible in *Randolph*. *Cf.*, *Georgia Pacific Corp. v. United States Plywood Corp.*, 318 F.Supp. 1116, 1120 (S.D.N.Y. 1970), *modified*, 446 F.2d 295 (2d Cir. 1971), *cert. den.*, 40 U.S. 870 (1971). But in the end *Randolph* instructs that judgment must be applied to come to a royalty figure which is fair and just where there is an inability to precisely quantify a reasonable royalty. The range of .18-.24 per cent is produced by the exercise of such judgment.

8. Having fixed on the top and bottom marks of the possible royalty, the negotiators would next decide where within those marks to hammer in their stake. In getting down to the short strokes of the bargaining, they would be set in motion toward the high of the .18-.24 per cent range, propelled in that direction by two factors.

First, the negotiators would be moved by what they would note as the persistence of defendant's bumper-making use of Henricks over many years in generally increasing proportions from modest beginnings at Chevrolet, Pontiac and Cadillac. They would regard the upward incline of defendant's appropriation as tending to prove the patent's desirability.

Second, I have no doubt that the bargainers would in real life, and will in the negotiations here hypothesized, give some consideration to the infringements in the non-bumper area for which no separate royalty would be assigned. While admittedly of far less importance to General Motors, easier to rectify, and not expressed in a way translatable into dollars and cents, the non-bumper infringements would be taken into account as a plus on the side of the patentee in settling on where in the range of reason the royalty percentage for bumpers should be fixed.

These factors, in combination, would tilt the negotiators to the top of the range of reason. I find they would select as the reasonable royalty .24 per cent of defendant's bumper sales based on dealer prices.

9. Finally, the bargainers would consider whether to include a provision for interest in the royalty arrangement.* As their clarity of vision would enable them to foresee all the uses made by defendant of the patented process, so they would not be blind to the events which would postpone the patentee's enjoyment of the bargained-for royalty for over twenty years.

Anticipating the possibility (or, as events proved, the certainty) that defendant might withhold payment of royalties earned, the bargainers would include as an integral part of the royalty arrangement a provision for interest. To strike a balance between avoiding the enrichment of defendant for wrongful withholding of amounts due, and compensating the patent holder for the loss of revenues justly owed, the negotiators would agree on a provision for defendant to pay interest (not compounded) at average annual corporate bond yields for each year in which royalties should have been but

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* Discussion of the law applicable to the award of interest appears in the section immediately following.

were not paid. This would roughly equal what the patentee could have earned with reasonable safety on its money had it been promptly paid. It would also approximate defendant's cost of money had it borrowed in the market rather than (in effect) from the patentee.

10. Thus would the hypothetical negotiations conclude. Encapsulating them, the results would be a royalty of .24 per cent of defendant's dealer-sales of bumpers, with interest to the patentee to compensate for the postponed enjoyment of the pecuniary benefits of the invention. I find that to be the measure of the reasonable royalty due from defendant on account of its infringement.

F. Interest

1. Plaintiffs are Entitled to Prejudgment Interest on the Law as well as the Facts.

In the discussion just concluded I have found that plaintiffs are entitled to interest as a matter of fact. Consonant with the hypothetical negotiation concept, rational bargainers would recognize the unfairness of obliging the patentee to bear loss of use of the money to which it would otherwise have been entitled during the twenty-odd year period defendant would refuse to make payment. No other conclusion seems to me plausible but that under such circumstances the parties would have included in the royalty arrangement a provision for interest from the respective dates the licensee ought to have paid royalties to the licensor.

But it is fairly arguable that a fact finding might not foreclose the issue. For there has not been called to my attention any decision where interest running from the date of infringement was awarded because as a matter of fact it would have been bargained for in the hypothetical negotiations. I say this not to apologize for having found that to be

the fact, but to recognize the possibility that a fact-finder may be without power to determine as a matter of fact (even if reasonable persons would agree that *is* the fact) that which could not be done as a matter of law. Because the impact of interest on the award is so large, the issue merits close analysis.

The circumstances under which interest is warranted by virtue of 35 *U.S.C.* § 284 is not a subject of judicial unanimity. Prior to the 1946 amendment (by which the predecessor of § 284 was changed to allow recovery of "damages" only, but not "profits") the general rule seems to have been that where damages were based upon an *established* royalty, interest ran from the date of infringement. However, where damages were based upon a *reasonable* royalty, interest ran from the date the damages were liquidated, absent "exceptional circumstances." *DuPlate Corporation v. Triplex Safety Glass Co.*, 298 U.S. 448, 459 (1936); *Swan Carburetor Co. v. Nash Motors Co.* 133 F.2d 562, 567 (4th Cir. 1943), *cert. den.*, 320 U.S. 762 (1943).

In its 1964 decision in *Afro Mfg. Co. v. Convertible Top Co.*, 327 U.S. 476 (1964), the Supreme Court indicated clearly (although by way of dictum) that by virtue of the 1946 amendment, the Congressional intent was for interest to be recoverable together with damages "... from the time infringement occurred ..." Adverting to the legislative history of § 284, the Court stated:

> "By the 1946 amendment, Act of August 1, 1946, c. 726, § 1, 60 Stat 778, 35 USC (1964 ed.), §§ 67, 70, the statute was changed to approximately its present form, whereby only 'damages' are recoverable. The purpose of the change was precisely to eliminate the recovery of profits as such and allow recovery of damages only.
>
> " 'The object of the bill is to make the basis of recovery in patent-infringement suits general dam-

> ages, that is, any damages the complainant can prove, not less than a reasonable royalty, *together with interest from the time infringement occurred*, rather than profits and damages.' HR Rep. No. 1587, 79th Cong 2d Sess (1946), to accompany HR 5311, at 1-2; S Rep No. 1503, 79th Cong 2d Sess (1946), to accompany HR 5311, at 2." (Emphasis supplied; footnote omitted.) 377 U.S. at 505-506.

Although one might have thought the foregoing expression by the Supreme Court to be dispositively clear, that has not been the case. Some courts have accepted at face value the Supreme Court's pronouncement in *Aro*, and have declared the rule to be that interest awarded under § 284 runs from the date of infringement. *Marvel Specialty Co. v. Bell Hosiery Mills, Inc.* 386 F.2d 287, 290-291 (4th Cir. 1967); *W.L. Gore & Associates v. Carlisle Corp.* 198 U.S.P.Q. 353 (D.Del. 1978); *Corometrics Medical Systems, Inc. v. Berkey Bio-Engineering, Inc.*, 193 U.S.P.Q. 467, 478-479 (M.D. Cal. 1977). Other courts, however, have rejected the quoted *Aro* case as a careless dictum not controlling on the interest question. Those courts have held that the effect of the 1946 amendment was to eliminate the *DuPlate* rule (requiring interest in reasonable royalty cases to run from the date damages are liquidated unless there are "exceptional circumstances") and have declared that the matter is entirely discretionary with the trial judge. *Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers, Inc.*, 446 F.2d 295, 301-302 (2d Cir. 1971); see *General Electric Company v. Sciaky Bros. Inc.*, 415 F.2d 1068, 1076-1077 (6th Cir. 1969). And some courts have continued, even after *Aro*, to apply the *DuPlate* rule. *Wahl v. Carrier Manufacturing Co., Inc.*, 511 F.2d 209, 214-215 (7th Cir. 1975); *Ellipse Corp. v. Ford Motor Co.*, 461 F.Supp. 1354 (N.D. Ill. 1978); *cf., H.K. Porter Co., Inc. v. Goodyear Tire & Rubber Co.*, 536 F.2d 1115, 1124 (6th Cir. 1976).

Of the cases which have regarded an interest award as discretionary, the rationales for the exercise of discretion have been non-uniform and difficult to reconcile. For example, Courts which follow the *DuPlate* rule appear to equate the "exceptional circumstances" under which pre-judgment interest is allowed, with bad faith or wilful conduct such as would justify awarding attorneys' fees or multiple damages. *Ellipse Corp. v. Ford Motor Co., supra; Carter Products, Inc. v. Colgate-Palmolive Co.* 214 F.Supp.383 (D. Md. 1963); *cf., H.K. Porter Co., Inc. v. Goodyear Tire & Rubber Co., supra,* (upholding interest award running from date of Master's report in non-wilful infringement case).

Other cases, however, are not so restrictive. In *Tights v. Kayser-Roth Corp.*, 442 F.Supp. 159, 166 (M.D.N.C. 1977), interest was awarded as of the date of infringement where the defendant, although not found to have acted in bad faith,* had infringed with full knowledge of the existence and scope of the patent. The Court concluded that the compensatory purpose of § 284 would not be served unless plaintiff could be placed in the position he would have been in had the defendant paid a reasonable royalty at the time defendant unlawfully used the plaintiff's invention. And in *Abbott v. Barretine Mfg. Co.*, 160 U.S.P.Q. 524, 527 (N.D. Miss. 1968) the Court, without finding justification for multiple damages or attorneys' fees, awarded interest "from the date [damages] would have been received by plaintiffs, but not prior to the date suit therefor was instituted by plaintiff corporation . . . ."**

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* The Court made no ruling in the Opinion as to whether multiple damages or attorneys' fees should be awarded.

** The significance of the date of the filing of suit is not clear from the opinion.

In the instant case it is unnecessary for me to decide which of the many competing rules is the correct one. For this question is controlled, at least in this District, by *W.L. Gore & Associates v. Carlisle Corp.*, 198 U.S.P.Q. 353, 371 (D. Del. 1978), where Judge Wright held:

> "... the law now seems to favor the assessment of compensatory interest on reasonable royalty awards, where necessary to make whole an injured patentee ..."
>
> * * *
>
> "The reasonable royalty is an approximation ... [of] the actual royalty which would have been paid had infringer negotiated with Patentee. The clear rule has been that moratory interest on actual royalties illegally withheld is appropriate. *Marvel Specialty Co., supra*, 236 F.2d 287, 290; *Carter Products, Inc. v. Colgate-Palmolive Co.*, 214 F.Supp. 383, 416 (D.Md. 1963). In the contemplation of the law, an infringer is on notice that a periodic payment is expected for his use of the patent. Patentee reasonably may expect to have the use of that money."

But even had *Gore* never been decided, and even were the slate clean for me to write freshly upon, I would rule both as a matter of law and of discretion that interest should run from the date of infringement without regard to whether defendant's behavior warranted multiple damages or attorneys' fees. Any other result would frustrate the compensatory purpose of § 284 and would be inconsistent with the result in other legal settings which are virtually indistinguishable.

First, if there had been an actual license providing for royalties which General Motors had breached, interest on a claim for unpaid royalties would run from the date the

royalties should have been paid. *Gridiron Steel Co. v. Jones & Laughlin Steel Corp.*, 361 F.2d 791 (6th Cir. 1966). And had there been an established royalty, the result would have been the same. *Swan Carburetor Co. v. Nash Motors Co.*, *supra*, and cases cited therein. The purpose of §284 is to compensate the patentee for the royalty to which it would have been entitled, absent the infringement, *i.e.*, to put the patentee in at least as good a position as where there was established royalty. To deny a patentee prejudgment interest puts it in a worse position than patentees receiving actual, or established royalties, for no discernible reason. Such apparent arbitrariness of treatment is unfair and makes no sense.

Second, a rule which would deny prejudgment interest is at odds with the treatment of patentees under the analogous area of the law governed by 28 *U.S.C.* § 1498. Section 1498 is a "condemnation" statute designed to compensate patentees in cases where the United States uses or manufactures the invention "without license ... or lawful right ..." In such cases, the patentee is entitled to sue the United States in the Court of Claims to recover his "*reasonable and entire compensation* for such use and manufacture ..." (emphasis added). Section 1498 is very similar to Section 284, which instead of using the language "reasonable and entire compensation," provides for "*damages adequate to compensate for the infringement*, but in no event less than a reasonable royalty ... together with interest ..." (emphasis added). Although Section 1498 does not explicitly provide for interest, it has long been judicially recognized that interest should be allowed to make the compensation "entire." *Waite v. United States*, 282 U.S. 508, 509 (1931).

Although Section 1498 (like Section 284) does not speak to the question of when interest begins to run, Section 1498 has been judicially construed to allow "delay compensation" from the date of infringement until the date of judgment. *Pitcairn*

v. United States, supra, 547 F.2d at 1120; *Tektronix Inc. v. United States*, 575 F.2d 832, 836-837 (Ct. Cl. 1978). The "delay compensation" has been thought to flow from the statutory mandate that the plaintiff receive "entire and reasonable compensation." *Pitcairn, supra*.

But I do not understand Section 284 to have any different purpose from Section 1498, as far as interest is concerned. In *Hartford National Bank & Trust Co. v. E.F. Drew & Co.*, 188 F.Supp. 347, 349 (D. Del. 1960), *aff'd* 290 F.2d 589 (3d Cir. 1961), *cert. den.*, 368 U.S. 825 (1961), Judge Leahy had the following to say regarding the purpose of interest under § 284:

> "The award of interest, here, is, however, not a punitive device. Allowed interest in this case represents damages for *delay in* payment and *compensation* for use of plaintiff's money that should have been included in withheld annual royalty statements which, of course, were never rendered by the infringer. In short, it is moratory interest and not contract or punitive interest." (Emphasis added; footnote omitted.)

I discern nothing in the cases which suggests why the treatment of delay compensation under Section 284 should be different from its treatment under Section 1498. The two statutes have the same purpose and it would take a sophistic semanticist to detect a difference in their substance. If there is a statutory reason why a plaintiff whose patent is infringed by the United States Government should have interest where a plaintiff whose patent is infringed by a private party should not, I have yet to fathom it.

Third, the underlying premise of a "reasonable royalty" is that of a hypothetically negotiated *contract* between a willing patentee and licensee. The rule in the area of contracts is that where the contractual breach consists of a failure to pay a fixed

or ascertainable monetary value (ascertainable from a standard fixed in the contract) interest is recoverable from the date payment is due. Restatement, *Contracts*, § 337; Restatement (Second) *Contracts*, § 368 (Tent. Draft No. 14, March 1, 1979). A rule allowing prejudgment interest is more consistent with the contractual rationale of a "reasonable royalty" than would be a rule disallowing such interest.

Finally, to the extent that the issue is regarded as purely discretionary, the compensatory purpose of Section 284 is not well served by a rule that would deny prejudgment interest except where the defendant has acted willfully or in bad faith. Prejudgment interest should be awardable even where, as here, the defendant acted in the good faith belief that its behavior was lawful. As stated by the Court in *Swan Carburetor Co. v. Nash Motor Co.*, *supra*, 133 F.2d at 567:

> "... [I]nterest in the case at bar should run from the dates when royalties should have been paid after the beginning of the accounting period. The District Judge found that the defendant made use of the Swan manifold in the bona fide belief that it was guiltless of infringement, and did not have certain knowledge that it was violating the plaintiff's rights until November 5, 1930, when the final decision in *General Motors v. Swan Carburetor Co.*, 6 Cir., 44 F.2d 24, was rendered. Hence the District Court thought that it would be equitable to calculate interest from that date, especially as the defendant prior thereto had ceased its infringement. These considerations are not without weight but in our view they should not control the decision. The defendant, having received due notice from the patent owner that it intended to insist upon its rights, deliberately continued to make use of the invention after the issue of the patent, and took the risk, now

> resolved against it by the decisions of the courts, that the patent might be declared valid. Manifestly this infringing use was a wrong from which the tort feasor should not be allowed to profit by being placed in a a better position than the manufacturers who respected the owner's rights and paid for licenses under the patent. We cannot accord to a patent infringer the privilege of using a patent, while unsuccessfully challenging its validity in the courts, and exempt him from the burden of paying the recognized price for his delay in meeting his obligations."

From the mid-1950's to now the patentee has been deprived of revenues justly due on account of defendant's appropriation. Meantime defendant, which fought hard but unsuccessfully to resist plaintiffs' claims, has had the use of monies rightfully belonging to plaintiff. To disallow interest would be to beatify that inequitable result. I have earlier found that as a matter of fact hypothetical negotiators would, foreseeing the long delay in payment, include a provision for interest as part of the reasonable royalty arrangement. I further conclude, for the reasons stated above, that both as a matter of law and as a matter of discretion, prejudgment interest should be awarded on account of the infringements as they occurred.

2. The Interest Computation

It appears to be the practice of the Court of Claims to award interest at prevailing commercial rates as the only way to provide "reasonable and entire compensation." *Pitcairn v. United States*, 547 F.2d 1108 (Ct. Cl. 1976); *Tektronix v. United States*, 552 F.2d 343 (Ct. Cl. of 1977). The Court of Claims in the above-cited cases chose the corporate bond rate as the prevailing commercial rate. Because corporate bonds

are generally low risk and average yield investments, on the facts and law here, this standard seems a fair choice.*

The parties early on stipulated to the prevailing corporate bond rates (as shown in "Moody's Industrial Manuals and Moody's Bond Record Monthly as the Moody's corporate bond yield composite averages") during the period from GM's first infringement down through December 31, 1977 and "for subsequent years they shall be computed in the same manner and pro rata for part of a year" (Stipulation dated November 29, 1978). The stipulation contained these rates:

Year for which Royalties Awarded	Accumulated Simple Interest Factor to 12/31/77 (at prevailing rate)
1956	133.68
1957	128.47
1958	125.31
1959	120.66
1960	115.93
1961	111.27
1962	106.65
1963	102.15
1964	97.57
1965	92.94
1966	87.60
1967	81.78
1968	75.27
1969	67.91

* While arguing against plaintiffs' entitlement to prejudgment interest, to the extent interest is allowable defendant does not strongly oppose the prevailing rate approach. (Oral Argument of 11/14/79 at Tr. 219-221). That approach is not new to this District. *Hartford National Bank & Trust Co. v. E.F. Drew & Co.*, 188 F.Supp. 347 (D .Del. 1960), *aff'd*, 290 F.2d 589 (3d Cir. 1961), *cert. den.*, 368 U.S. 825 (1961).

Plaintiffs' post-trial memorandum on the point showed an interest calculation on the same basis *(Moody's* corporate bond yield composite) for the calendar year 1978 of 9.07 per cent. In their pre-oral argument presentation plaintiffs submitted, with supporting excerpts from *Moody's*, that prevailing corporate bond rates would have yielded an investor an 8.15 per cent return through the first ten months of 1979. The 8.15 per cent represents five-sixths (1/1/79 - 10/31/79) of 9.775 per cent which is the average of *Moody's* corporate bond annual yield composite averages for the first nine months of 1979 as follows:

January	9.65%	June	9.81
February	9.63	July	9.69
March	9.76	August	9.74
April	9.81	September	9.93
May	9.96		

See Appendix to Volume I of plaintiffs' interest presentation, pages 2-6.

While plaintiffs' figures even now need updating, and this, when done, will eliminate the need to estimate October's rate on the basis of the prior nine months' average, defendant has neither disputed plaintiffs' numbers nor the way in which they were calculated. Hence, while the interest to which plaintiffs are entitled will need to be fine-tuned by a bring-down of the *Moody* figures to the date of final order, as the record now stands I accept plaintiffs' figure and award interest for the period January 1-October 31, 1979 at the rate of 8.15 per cent.

Thus, to the interest figures in the parties' stipulation, which had provided rates through 1977, there should be added 9.07 per cent to cover 1978, and 8.15 per cent for the first ten months of 1979. Adding 17.22 per cent to the stipulated

commercial rates produces the following interest factors through October of 1979:

Years for which Royalties Awarded	Accumulated Simple Interest Factor to 10/31/79 (at prevailing rate)
1956	150.90
1957	146.69
1958	142.53
1959	137.88
1960	133.15
1961	128.49
1962	123.87
1963	119.37
1964	114.79
1965	110.16
1966	104.82
1967	99.00
1968	92.49
1969	85.13

G. Accounting

1. Introduction

From the findings made to this point, the accounting becomes an arithmetic calculation. For simplicity of understanding a division-by-division approach will be used, with a breakdown to infringing bumper practices within each division year by year. The formulation will identify sales volume for each such infringing practice, apply to those volumes the .24 per cent royalty hypothetically struck, and add interest. That being the conception, the accounting follows:

2. Chevrolet

The sales value* for the 94,523,568 bumper parts that Chevrolet produced by infringing practices (APTO, CL:10), and the reasonable royalty thereon calculated at .24%*, is as follows:

Infringing Practice	Year	Sales Value	Reasonable Royalty at .24%	Interest Rate (%)	Interest	Total Royalty and Interest
12	1958	$ 19,087,556	$ 45,810.10	142.53	$ 65,293.14	$ 111,103.24
12	1959	96,133,986	230,721.60	137.88	318,118.94	548,840.54
12	1960	98,893,537	237,344.50	133.15	316,024.20	553,368.70
12 & 13	1961	57,519,264	138,046.20	128.49	177,375.56	315,471.76
12	1962	119,068,270	285,763.80	123.87	353,975.62	639,739.42
12	1963	142,194,546	341,266.90	119.37	407,370.30	748,637.20
12	1964	134,261,986	322,228.80	114.79	369,886.44	692,115.24
12 & 14	1965	88,287,411	211,889.80	110.16	233,417.80	445,307.60
14	1966	84,485,105	202,764.30	104.82	212,537.54	415,301.84
14	1967	123,524,669	296,459.20	99.00	293,494.61	589,953.81
14	1968	129,074,863	309,779.70	92.49	286,515.24	596,294.94
14	1969	136,728,881	328,151.70	85.13	279,355.54	607,507.24
		$1,229,261,074	$2,950,226.60		$3,313,364.93	$6,263,591.53

* Sales value, on this chart and the charts which follow it, represents the total number of bumper parts produced by infringing practices times the unit selling prices to GM dealers, even though in fact only about 10% of the bumpers produced were sold to dealers. The remainder were sold as original equipment on automobiles. As previously noted, the only selling price available for these parts is GM's selling price to its dealers. The sales value figures on the above stated premises were agreed to by the parties (APTO, CL:10).

For purposes of clarity it should be said that relatively little of the 1961 infringement stemmed from Infringing Practice 13, the use of Pennwalt Drawcote 1047 (APTO, CL:1). Most of it resulted from the use of Kerns 3833, Infringing Practice 12 *(Ibid.)*. The allocation of the $138,046.20 royalty for 1961 breaks down to $129,929.10 for Infringing Practice 12 based on the use of 12,800 pounds of lubricant Kerns 3833 (94.12% of the total lubricant) and $8,117.10 for Infringing Practice 13 based on the use of 800 pounds of lubricant Drawcote 1047 (5.88%) (APTO, CL:8).

For 1965 in the breakdown between Infringing Practices 12 and 14, $21,949 was allowed for Infringing Practice 12 based on the sales value of $9,145,410 from the use of lubricant Kerns 3833 (2,400 pounds), and $189,940.80 for Infringing Practice 14 based on the sales value of $79,142,001 from the use of lubricant Bonderlube 200 (18,980 pounds) (APTO, CL:10).

3. Pontiac

Parallel with the Chevrolet calculations, the sales value for the 22,080,159 bumper parts that Pontiac produced by infringing practices (APTO, P:18), and the reasonable royalty thereon calculated at .24%, with interest added, is as follows:

Infringing Practice	Year	Sales Value	Reasonable Royalty at .24%	Interest Rate (%)	Interest	Total Royalty and Interest
Prior Trial Prac. and 48	1956	$ 20,851,713	$ 50,044.10	150.90	$ 75,516.55	$ 125,560.65
Prior Trial Prac.	1957	38,324,037	91,977.70	146.69	134,922.09	226,899.79
Prior Trial Prac.	1958	26,563,654	63,752.80	142.53	90,866.87	154,619.67
Prior Trial Prac. and 49 and 51	1959	41,858,559	100,460.50	137.88	138,514.94	238,975.44
51	1960	48,175,964	115,622.30	133.15	153,951.09	269,573.39
51	1961	31,052,362	74,525.70	128.49	95,758.07	170,283.77
51	1962	48,488,559	116,372.50	123.87	144,150.62	260,523.12
51	1963	55,404,795	132,971.50	119.37	158,728.08	291,699.58
53	1964	75,490,002	181,176.00	114.79	207,971.93	389,147.93
52 and 53	1965	87,528,591	210,068.60	110.16	231,411.57	441,480.17
50, 52 and 53	1966	85,281,475	204,675.50	104.82	214,540.86	419,216.36
50, 52 and 53	1967	81,750,445	196,201.10	99.00	194,239.09	390,440.19
50, 52 and 53	1968	94,055,341	225,732.80	92.49	208,780.27	434,513.07
Totals		$734,825,497	$1,763,581.10		$2,049,352.03	$3,812,933.13

Again, for clarity, the breakout of the 1959 royalty figures should be shown. The reasonable royalty of $100,460.50 for that year combines $33,486.80 allocated to the prior trial infringing practices (and the related Infringing Practice 48) based on the sales value of $13,952,827 from the use of lubricant Bonderlube 246 (APTO, P:18, 9), and $66,973.70 allocated to Accused Practices 49 and 51 based on the sales value for seven months (January - July 1959) of $27,905,732 from the use of lubricants Parker PTD 1239A and Bonderlube 249A (APTO, P:18, 9). The reasonable royalty of $66,973.70 is, based on the period of use by Infringing Practices 49 (2 months - 2/7ths) and 51 (5 months - 5/7ths), prorated as follows: Infringing Practice 49, $19,135.30, and 51, $47,838.40. Infringing Practices 50, 52 and 53, all involving the use of Parker TKPP-containing lubricants, are combined for the years 1964-1968 although they were used at overlapping times during that period because no purpose is served by separating them.

4. Cadillac

Again on the same basis as the Chevrolet figures, the sales value for the 11,528,284 bumper parts that Cadillac produced by infringing practices (APTO, CAD:8), and the reasonable royalty thereon calculated at .24%, with interest added, is as follows:

Infringing Practice	Year	Sales Value	Reasonable Royalty at .24%	Interest Rate (%)	Interest	Total Royalty and Interest
4	1959	$ 6,075,278	$ 14,580.70	137.88	$ 20,103.87	$ 34,684.57
—	1960	—	—	—	—	—
5	1961	2,661,690	6,388.10	128.49	8,208.07	14,596.17
5	1962	52,238,582	125,372.60	123.87	155,290.04	280,662.64
5	1963	39,953,219	95,887.70	119.37	114,461.15	210,348.85
5 & 6	1964	43,674,508	104,818.80	114.79	120,321.50	225,140.30
6	1965	48,561,410	116,547.40	110.16	128,388.62	244,936.02
6	1966	59,610,782	143,065.90	104.82	149,961.68	293,027.58
6	1967	62,425,675	149,821.60	99.00	148,323.38	298,144.98
6	1968	68,231,343	163,755.20	92.49	151,457.18	315,212.38
Totals		$383,432,487*	$920,238.00		$996,515.49	$1,916,753.49

* The individual items shown in the pre-trial order were added to total $383,432.587. The total appears to be $100 off the mark.

5. Fisher-Body Elyria

Finally, the sales value for the 2,905,425 bumper parts that Fisher-Body Elyria produced by infringing practices (APTO, FB:10), and the reasonable royalty thereon calculated at .24%, with interest added, is as follows:

Infringing Practice	Year	Sales Value	Reasonable Royalty at .24%	Interest Rate (%)	Interest	Total Royalty and Interest
36	1957	$ 7,856,454	$18,855.50	146.69	$ 27,659.13	$ 46,514.63
36	1958	15,160,154	36,384.40	142.53	51,858.69	88,243.09
36	1959	11,284,448	27,082.70	137.88	37,341.63	64,424.33
36	1960	6,286,467	15,087.50	135.15	20,390.76	35,478.26
Totals		$40,587,523	$97,410.10		$137,250.21	$234,660.31

6. Summary

Division	Infringing Practices	Reasonable Royalty	Interest Thru 10/31/79	Total Royalty and Interest
Chevrolet	12, 13, 14	$2,950,226.60	$3,313,364.93	$ 6,263,591.53
Pontiac	Prior Trial 48, 49, 50, 51, 52, 53	1,763,581.10	2,049,352.03	3,812,933.13
Cadillac	4, 5, 6	920,238.00	996,515.49	1,916,753.49
Fisher-Body Elyria	36	97,410.10	137,250.21	234,660.31
Grand Total of Accounting		$5,731,455.80	$6,496,482.66	$12,227,938.46

IV. CONCLUSION

The foregoing constitutes the report of the special master, submitted to the parties and filed with the Clerk as provided for at F.R.C.P. 53(e).

/s/ Bruce M. Stargatt
Special Master

Dated: February 7, 1980

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

DEVEX CORPORATION, et al.,
Plaintiffs,

v.

Civil Action
No. 3058

GENERAL MOTORS CORPORATION,
Defendant.

OPINION

August 22, 1980
Wilmington, Delaware
WRIGHT, Senior Judge

Devex Corporation ("Devex") seeks more than $100 million actual damages, plus punitive damages, interest, attorneys' fees and costs for infringement by General Motors Corporation ("G.M.") of Claim 4 of Devex's patent[1] for a process to pressure-form metal objects.

This case began in 1956-57 when Devex sued G.M. and Houdaille Industries, Inc. in the Northern District of Illinois. In 1962, Judge Edwin A. Robson ruled that Claim 4 of Devex's patent was invalid.[2] A year later, however, the Seventh Circuit Court of Appeals reversed and held that

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[1] Reissue Patent No. 24,017 issued to Devex's assignee John A. Hendricks on June 7, 1955, on Original Patent No. 2,588,234, dated March 4, 1952, based on an October 31, 1950 application.

[2] Principal Documents on Accounting, No. 2.

Claim 4 was valid.[3] The Supreme Court denied G.M.'s motion for review.[4] G.M. and Devex then moved their dispute here. Following trial, this Court found that three of G.M.'s accused practices did not infringe Claim 4,[5] a finding that the Third Circuit Court of Appeals reversed on appeal.[6]

This Court subsequently appointed a Special Master, Bruce M. Stargatt, Esquire, who worked hard, long and well to determine which of G.M.'s other accused practices infringed Claim 4 and to set a reasonable royalty that G.M. should pay for its infringement. With the Master's guidance, the parties took dozens of depositions, propounded and answered hundreds of interrogatories and produced thousands of documents. A hearing followed, consuming fifty-three days between October 30, 1978 and February 14, 1979. Following briefing and argument, the Master released his report on February 7, 1980. Presently before this Court are the parties' Exceptions to the Report of the Special Master.

THE INVOLVED PROCESS

Claim 4 covers:

> The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed there through a solid inorganic com-

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[3] Devex Corp. v. General Motors Corp., 321 F.2d 234 (7th Cir. 1962).

[4] Devex Corp. v. General Motors Corp., 375 U.S. 971 (1964).

[5] Devex Corp. v. General Motors Corp., 316 F.Supp. 1376 (D.Del. 1970).

[6] Devex Corp. v. General Motors Corp., 467 F.2d 257 (3d Cir. 1972).

> pound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal.

As the Master noted: "The 'organic binding material' contemplated by the patent is soap. The 'inorganic compound' is borax, or some other inorganic substance meeting the patent's claims and performing the same function as does the borax."[6]

The happy result of this process is that phosphate, soap and borax work to lubricate the pressure-forming operation, preventing harmful contact between the metal products and the machinery with which they are formed. Although other lubricants may be used, the phosphate, soap and borax combination is especially beneficial because it may be easily cleaned from the metal product following its formation.

THE MASTER'S FINDINGS

The Master first found that, from among G.M.'s approximately sixty allegedly infringing practices, practices 4-5, 7, 9, 12-13, 16-17, 22, 25 (in part), 26-28, 30-31, 36-38, 42, 47-49, 51, 54 and 56 all clearly infringed Devex's patent. In addition, the Master found that chemicals tetrapotassium pyrophosphate (TKPP) and trisodium phosphate (TSP) were borax equivalents. Thus, the Master found that the use of phosphate, TKPP and soap in accused practices 6, 14, 50 and 52 infringed Claim 4. He found that the remaining practices did not infringe Claim 4 for a variety of reasons.

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[6] Report of Special Master (hereinafter "Master's Report"), p. 7.

First, the Master held that Claim 4 included a requirement that products be cleaned following their formation. Because accused practices 2, 3, 10, 11, 15, 19-21, 25 (in part), 33-35, 39-41 and 44-45 included little or no cleaning, he found that these processes did not infringe. Second, the Master held that Claim 4 included a requirement that borax be used as a lubricant and/or as a cleaning agent. Because Devex failed to show that borax was used for either of these purposes in accused practices 1, 2, 8, 18, 20, 23-24, 29 (in part), 32, 34-35, 39, 43, 55 and 57-58, he found them to be non-infringing. Finally, the Master rejected accused practice 1 (after 1963), 8 and 46 because Devex failed to show that these processes in any way involved the use of borax or its equivalents.

The Master next assessed damages for the infringing practices. In many of these practices, including 4-6, 12-14, 36 and 48-53, G.M. manufactured bumper parts. In setting royalties for these practices, the Master first noted Devex's industry-wide offer, made soon after the Supreme Court declined to review the Seventh Circuit's determination that Claim 4 was valid, to license in return for a royalty of 0.75% of the value of the products manufactured by the use of Claim 4. Although the parties failed to present direct evidence regarding the value of G.M.'s bumpers in the mounted-on-the-car form in which they were usually sold, Devex did present evidence of the price at which G.M. sold its bumpers as parts. Devex's experts next argued, and the Master found, that bumpers on their mounted-on-the-car form should be valued at about 48% of the price at which G.M. sold them as parts. The Master, thus, calculated that the value of the approximately 130 million bumper parts formed by using the process of Claim 4 totalled about $1.15 billion. Multiplying this figure by 0.75%, the Master found that the price of Devex's 1964 offer totalled $8,607,183.70. The Master then found that through subsequent negotiations, the parties

would have reduced this figure by one-third, to about $5.7 million.

The Master further found that G.M. would have agreed to pay interest at a composite corporate bond rate for the use of the royalty monies over the many years since its initial infringement.[7] Accordingly, the Master increased his assessment by about $6.5 million, arriving at a total figure of about $12.2 million, as damages for G.M.'s use of the Claim 4 process to manufacture bumpers.

G.M. also used the infringing process to manufacture other products besides bumpers. The Master, however, ruled that Devex failed to adduce sufficiently reliable evidence regarding a reasonable royalty for the manufacture of these products. Therefore, the Master found that Devex was not entitled to recover anything for G.M.'s use of the Claim 4 process to manufacture products other than bumpers.

The Master refused to award multiple damages, or attorney's fees, finding that G.M.'s infringement was insufficiently aggravated.

PLAINTIFFS' OBJECTIONS TO THE MASTER'S FINDINGS[8]

Devex first seeks to widen the scope of infringing processes to include processes in which metal was treated with

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[7] For the actual method of computation, which the Court hereby approves, *see* Master's Report, p. 153.

[8] In considering the parties' objections, the Court is particularly mindful of the presumption of validity normally attaching to a Master's factual findings. Unless such findings are shown to be clearly erroneous, they

continued on next page

phosphate, soap and borax and pressure-formed, although the process did not include any cleaning operation. Devex argues that Claim 4 does not require cleaning. Rather, Devex argues the fact that metal products may be easily cleaned following their formation was an incidental benefit. Devex further argues that the "user of a patented invention does not avoid infringement by failing to utilize all the benefits of the invention."[9]

Plaintiffs' argument misinterprets the import of the earlier decisions in this and related cases, holding that Claim 4 requires cleaning as an integral step of its process. The Court particularly notes the Seventh Circuit's July 12, 1967 decision in *Devex Corp. v. Houdaille Corp.*, 382 F.2d 14. That case is especially relevant, even though Devex and G.M. had previously moved their dispute from the Seventh Circuit, because it interprets the Seventh Circuit's 1963 decision rendered while the dispute between G.M. and Devex was still before that Court. The background to the 1967 case is that, in 1965, Judge Robson granted summary judgment in favor of Devex on the issue of infringement. The lynchpin of Judge

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must be accepted. Federal Rules of Evidence 53(e)(2); W. L. Gore & Associates, Inc. v. Carlisle Corp., 198 U.S.P.Q. 353 (D.Del. 1978). "A finding is 'clearly erroneous' when although there is evidence to support it, the reviewing court on the entire evidence is left with the definite and firm conviction that a mistake has been committed." United States v. United States Gypsum Co., 333 U.S. 364, 395 (1948). Of course, the "clearly erroneous" standard does not apply to the Master's legal conclusions which "have no effect except to the extent they are correct propositions of law." 5A J. Moore, Federal Practice ¶53.12[5] (2d Ed. 1980).

[9] Brief In Support Of Plaintiffs' Exceptions to The Special Master's Report (hereinafter "Plaintiffs' Brief"), p. 181.

Robson's decision, reported at 148 U.S.P.Q. 74, was that Claim 4 should be literally interpreted. Although Claim 4 was and is very broad, Judge Robson refused to "read into the claim a requirement" that would limit its scope. *Id.*, p. 77.

On appeal, the Seventh Circuit held that their 1963 "decision requires that the claim in suit be given a narrow and restricted construction."[10] The Seventh Circuit Panel then reviewed the setting for its prior decision:

> [I]t was conceded that all of the elements of the claim were old in the art, but plaintiffs sought to uphold validity upon the basis that such elements "were put together in a new way and achieved a new and unexpected result." It was solely on this basis that this Court sustained validity and reversed the District Court.
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> . . . .
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> Thus, having obtained a decision of validity on a narrow and restricted basis, they now contend, inconsistently we think, that the claim must be applied literally to defendant's alleged infringing process. Such a construction would monopolize the whole broad field of metal forming with any use of a dry soap and borax over phosphate at any temperature or pressure, regardless of the results.[11]

Clearly, then, the Seventh Circuit contemplated that Claim 4 should be afforded a more limited interpretation than its literal reading might otherwise suggest. The Third Circuit expressly recognized the applicability of the Seventh Circuit's findings, ruling that "[C]laim 4, even as restricted and held valid in the Seventh Circuit, covers and protects the combina-

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[10] Devex Corp. v. Houdaille Corp., 382 F.2d 17, 22 (7th Cir. 1967).

[11] *Id.*, pp. 22-23.

tion of soap and borax . . . so that the process will yield its claimed advantages."[12]

The Seventh Circuit contemplated that cleaning metal products would be required as an integral part of Claim 4. Devex's patent involved a combination of well-known and often-used parts. One prior art patent disclosed the use of a phosphate coating. Another patent disclosed the use of lubricants containing soap and borax and a prior art publication disclosed the use of a soap lubricant over a phosphate coating.[13]

Judge Robson's 1962 opinion recognized that a new combination of old elements may be patentable, but only if it "achieves new and surprising results, or stated differently, the whole exceeds the sum of the parts."[14] Subsequent opinions by both the Seventh and the Third Circuits repeated this test.[15] Devex's problem then was to articulate the new and surprising result of its process. To this end, Devex stressed how easily the products of its process, once formed, might be cleaned.[16] This result contrasted with the results of other processes, which, while showing an acceptably high level of lubrication, caused zinc stearate to form on and adhere to the surface of the formed product. Since zinc stearate is insoluble in water, it can be removed only through difficult, time consuming and expensive cleaning.

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[12] Devex Corp. v. General Motors Corp., 467 F.2d 257, 262-3 (1972).

[13] Principal Documents on Accounting, No. 2.

[14] *Id.*

[15] Devex Corp. v. Houdaille Industries, Inc., 382 F.2d 17, 22 (7th Cir. 1967); Devex Corp. v. General Motors Corp., 467 F.2d 257, 258 (3d Cir. 1972).

[16] Principal Documents on Accounting, No. 2A, No. 3A.

The primary importance of Devex's process was not that the addition of borax somehow enhanced lubricity. Rather, the addition of borax inhibited the formation of zinc stearate resulting in products that could be easily cleaned. Devex thus relied upon the case of cleaning to defend the validity of what would otherwise have been an overly broad claim.

Devex claims, however, that "it is clearly established that a Court may not add limitations to claims in order to make them patentable. *Graver Mfg. Co. v. Linde Co.*, 336 U.S. 271, 277 (1949)." Where Claim 4 did not literally impose a requirement of cleaning, Devex argues, courts were powerless to impose one.

Devex's reliance on *Graver Mfg. Co.* is misplaced. On reargument, the Supreme Court clearly rejected "as subordinating substance to form" the rule of literalism which Devex now seeks to resurrect. Indeed, *Graver Mfg. Co.* specified a thorough review of all available interpretative aids and a number of cases have accepted this direction. Chisum, Patents §18.04[4] (1980). *See e.g. Huntman Stabilizer Corp. v. General Motors Corp.*, 144 F.2d 963 (3d Cir. 1944). Although courts may not rewrite patent claims, they may interpret them so as to avoid a finding of invalidity.[17] Neither precedent nor logic dictate that a claim which has been narrowly construed in order to survive a validity determination should be interpreted more broadly when it comes to determining what practices violate its coverage. Accordingly, the Court accepts the Master's finding that "[p]ractices as to which little or no cleaning was required do not infringe" Claim 4.

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[17] Application of Prater, 415 F.2d 1393 (C.C.P.A. 1969); Huntman Stabilizer Corp. v. General Motors Corp., 144 F.2d 963 (3d Cir. 1944).

Devex next attacks the Master's conclusion that practices applying borax as a rinse to phosphate coated metal and then applying soap were non-infringing. The Master claimed that this conclusion was supported by several considerations, all of which must be rejected.

The Master first found that "there was not a shred of evidence that borax (or equivalent) rinses were employed for the purpose of enhancing either the lubricity of the work-piece, or its post-formation cleanability. Rather, the Master concluded "[T]he record as a whole demonstrates that the only purpose of the borax in the accused rinse processes was to neutralize acid carryover from the phosphate bath."[18] The Master also considered the beliefs of Devex, its assignor and G.M. regarding the purpose for using borax rinses.[19] The history of this litigation, however, shows the fallacy of considering the reason why Claim 4 specifies the use of borax. In an earlier opinion, this Court carefully reviewed involved chemical principles, considering the purpose for which Claim 4 required the use of borax. This Court then concluded that G.M. had not infringed Claim 4 because Devex had failed to demonstrate that GM's purpose in using borax matched the purpose for which its use was specified in Claim 4.[20] On appeal, the Third Circuit rejected this approach, ruling: "[I]f it is directly determinable that the two lubricants have essentially the same components, are applied in the same way and that the results of their use are essentially the same, the disputation of chemists about the chemical interactions that occurred in the processes cannot be decisive."[21]

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[18] Master's Report, p. 46.

[19] *Id.*, pp. 48-51.

[20] Devex Corp. v. General Motors Corp., 316 F.Supp. 1376, 1383-86 (D.De. 1970).

[21] Devex Corp. v. General Motors Corp., 467 F.2d 257, 261 (3d Cir. 1972).

In applying this test, the Court first notes the similarity between the borax rinse processes and the other processes in which borax was used as an integral part of metal forming. In both processes, phosphated metal was dipped in a borax solution,[22] treated with soap, formed, and, in some cases, cleaned with good results. To the extent that the borax rinse processes involve cleaning, then, they meet the Third Circuit's test of infringement. To the extent that these processes do not involve cleaning, they do not infringe Devex's patent, but only because they do not involve cleaning.

The Master next assumes the position that file wrapper estoppel prevents Devex from accusing the G.M. processes that involve a borax rinse. Under this doctrine, a patentee cannot later claim what the Patent Office required him to surrender in order to obtain his patent.[23] In this case, the Master found that Devex's assignor initially included an Example XXXV involving a borax rinse in his application.[24] Devex's assignor then "cancelled that example when the patent examiner required that the specification be shortened and limited to 'such parts of it as are commensurate with claims that the applicant will continue to prosecute.'"[25] The prob-

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[22] G.M. might argue that the concentration of borax in the rinse solution was usually lower than the concentration in the integral borax solutions. This rule, however, was not universal. Master's Hearing Transcript, pp. 117-125. G.M. might also argue, as the Master found, that Devex "offered no credible quantitative proof as to the amount of borax from the rinse likely retained in the coating after the lubricant bath." Master's Report, p. 45. Still, the above cited hearing testimony indicates that the borax rinse deposits were substantial. Thus, the Master "credit[ed] the testimony that at least some borax stayed on the workpiece." Master's Report, p. 45.

[23] Chisum, Patents §18.05 (1980).

[24] PX-3, p. 63.

[25] Master's Report, p. 48

lem with this argument is that it is unclear whether the examiner's objections were aimed at Example XXXV's borax rinse or at some other procedure. Indeed, the file wrapper is silent on this issue.[26] To the extent there is any evidence on this issue it indicates that the Patent Office believed that Devex's patent covered borax rinses. Thus, the Patent Office permitted Devex's patent to issue with at least one example, Example VIII, suggesting the use of a borax rinse.

Devex next attacks the Master's finding that accused practices 1 (after 1963), 8 and 46 in no way involved the use of borax and so were non-infringing. This finding, however, is based entirely upon the inferences to be drawn from the disputed evidence. The Master so meticulously reviewed and resolved this evidentiary dispute and it would be useless to repeat his discussion here.[27] Careful scrutiny of his findings, however, shows that they are not clearly erroneous; Devex failed to adduce enough evidence to give the Court a "definite and firm conviction" that the Master made a mistake. Accordingly, the Court affirms these findings.

Devex next attacks the Master's calculation of a reasonable royalty covering G.M.'s use of the Claim 4 process to make automobile bumpers. Devex claims that the Master erred in placing so much reliance upon Devex's 1964 industry-wide offer to license Claim 4 at 0.75% of the value of the products manufactured using Claim 4. Instead, Devex argues, the Master should have used the five percent of value figure suggested by its experts.

The ideal patent royalty assessment would be the rate at which a "willing buyer and a willing seller" would agree in an arms-length negotiation. *Horvath v. McCord Radiator &*

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[26] PX-3, p. 103

[27] Master's Report, pp. 53-59.

Manufacturing Co., 100 F.2d 326 (6th Cir. 1938). Devex argues that it is entitled to a high royalty rate on the basis of its contention that it was very expensive to substitute other processes for that of Claim 4.

The Master, however, reached an opposite conclusion, finding that several of G.M.'s divisions regularly substituted non-infringing processes for infringing ones and *visa versa*. Thus, Oldsmobile used non-infringing practices to make almost all of its bumpers. Similarly Chevrolet relied, though less successfully, upon non-infringing processes until November, 1958, and used non-infringing processes to manufacture part of its bumper needs from 1960 to 1963 and from 1965 to 1966. Cadillac used non-infringing processes prior to 1962 and after 1968. Fisher Body used non-infringing processes prior to 1957 and after 1960. Where G.M.'s various divisions so often produced marketable cars without using Devex's process, the Court finds, as the Master did also, that G.M.'s negotiators would not have agreed to the high figure Devex now proposes.

Devex argues, however, that the use of its process saved G.M. at least $1.53 per bumper, or a total of some $75 million at G.M.'s Chevrolet Division alone. Although a patentee should be allowed some freedom in choosing the standard of comparison by which the savings to be derived from the use of its process may be calculated, a patentee is not free to choose any standard of comparison. Rather, his standard must be acceptable.[28] There must be some basis for believing that the alternative process on which his standard is based was a realistic alternative, and not some process the only possible value of which is to make the patentee's process appear more useful than, in fact, it is. Where Devex's $1.53 figure derives

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[28] Gordon Form Lathe Co. v. Ford Motor Co., 133 F.2d 487, 495 (6th Cir. 1943).

from comparing the cost of forming a bumper using an outdated process[19] which appears to have been so expensive that as early as 1950 industrial publications recommended against using it and all of G.M.'s various divisions followed this advice, the Court finds that Devex's standard of comparison is unacceptable and that its $1.53 figure is irrelevant.

Another factor militating against the high royalty Devex now seeks is the fact that Devex did not own or operate its own manufacturing plant. Devex could reap the benefit of its patent only by convincing others to use it, offering them a patent license at an acceptably low rate. For these reasons, the Court rejects Devex's very high royalty demand.

Instead, the Court finds that a figure totalling 0.75% of sales is a reasonable royalty for G.M.'s infringement. Indeed, it is the very figure at which Devex voluntarily offered to license its patent in 1964. At that time, Devex was dealing from a position of strength because the Seventh Circuit had declared its patent valid and the Supreme Court had declined to review this decision. The 0.75% figure is not overly generous. *Compare Randolph Laboratories v. Specialties Development*, 213 F.2d 873 (3d Cir. 1954). Still, it is large enough to compensate Devex fully.

The Court recognizes that patentees must carry the burden of proving the level of royalties to which they are entitled. *W.L. Gore & Associates, Inc. v. Carlisle Corp.*, 198 U.S.P.Q. 353 (D.De. 1978). A patentee, however, need not prove its case to an unreasonable certainty. *Gordon Form Lathe Co. v. Ford Motor Co.*, 133 F.2d 487, 394 (6th Cir. 1943). Thus, where there is evidence that a patentee made a reasonable and *bona fide* licensing offer, it becomes defendant's duty to show the level by which, the offer exceeds a reasonable royal-

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[19] DX-A-9, Item 1, p. 251.

ty.[30] In this case, G.M. failed to adduce a shred of reliable evidence that Devex's offer was unfair.

The Master found that the 0.75% figure should be reduced by one third. This finding was based upon the idea that 0.75% was only a bargaining figure from which Devex's negotiations could be expected to retreat. Royalty calculations, however, must be based upon evidence — not mere speculation. *Trio Process Corporation v. L. Goldstein's Son, Inc.* 533 F.2d 126 (3d Cir. 1976). Without some evidence showing that Devex would have accepted a lower royalty figure and, if so, what that lower figure might be, this reduction is improper. The Court, therefore, accepts 0.75% of sales, or $8,607,183.70, as a reasonable royalty for G.M.'s use of the Claim 4 processes for forming bumpers.

Devex next attacks the Master's recommendation against awarding any damages for G.M.'s use of the Claim 4 process to make non-bumper parts. Devex claims that the use of its process permitted G.M. to make substantial savings of which, Devex claims, it is entitled to 56.5%. Devex again focuses on uneconomical techniques, including machining and hot forging.[31] Devex claims that its focus is justified by the fact that G.M., in determining when to authorize the investment for equipment necessary to use the infringing process, sometimes calculated its expected savings versus the cost of continuing to use its older machining or hot-forging equipment.

Devex's argument must be rejected. Hot-forging and machining techniques are too old and inefficient to be viewed as viable alternative methods to make the kinds of non-

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[30] The rationale for reversing the burden of proof here is the same as that which is articulated by Gordon Form Lathe Co. v. Ford Motor Co., 133 F.2d 487, 394-96 (6th Cir. 1943).

[31] Plaintiff's Brief, p.129.

bumper parts that G.M. used Devex's Claim 4 process for. Devex's proposed basis for comparison then is unacceptable. Devex failed both to suggest and to offer proof regarding any other means to calculate the reasonable royalties to which it is entitled. Because Devex thus failed to prove the level of damages to which it was entitled, the Master properly found that it should receive nothing. *W.L. Gore & Associates, Inc. v. Carlisle Corp.*, 198 U.S.P.Q. 353, 367 (1978).

Assuming, *arguendo* that Devex's standard of comparison is acceptable, Devex is not automatically entitled to the damages it would claim. Rather, G.M. must be afforded an opportunity to offer alternative standards for comparison. *Gordon Form Lathe Co. v. Ford Motor Co.*, 133 F.2d 487, 396 (6th Cir. 1943). In this case, the Master painstakingly reviewed the benefits of Devex's process versus those of other non-infringing pressure forming operations. He found that G.M.'s various divisions easily substituted non-infringing processes to manufacture non-bumper parts. Apparently, then, Devex's process was of "relatively slight importance to" G.M., and for this reason the Master properly found that G.M. should not be required to pay anything for its infringement in the manufacture of non-bumper parts.

Devex next complains that the Master improperly rejected its claim for multiple damages and attorneys' fees. As the Master found, however, G.M.'s defense of this case is not characterized by the inequitable dealings normally required for the award of multiple damages under 35 U.S.C. §284 or of attorneys' fees under 35 U.S.C. §285. Accordingly, the Court approves the Master's determination of these issues.

DEFENDANT'S OBJECTIONS TO THE MASTER'S FINDINGS

G.M. first argues that the Master improperly found that the Third Circuit Court of Appeals previously ruled that

processes using "Bonderlube 235" infringed Devex's patent. G.M.'s argument looks to the history of this litigation. Shortly after this litigation was transferred here, this Court ruled that of the three accused practices, including one that used "Bonderlube 246" and two that used "Bonderlube 235", none were infringing. This decision was reversed on appeal in an opinion in which the reviewing Third Circuit panel focused on showing the infringing nature of the "Bonderlube 246" process. Defendant now claims that the Third Circuit panel intended to leave standing this Court's judgment that "Bonderlube 235" processes did not infringe Devex's patent Claim 4. The Court finds no support for this claim and rejects it for the reasons set forth by the Master.[32]

G.M. next seeks to narrow the scope of infringing processes, arguing that TKKP and TSP are not borax equivalents, and that TKKP's use in accused practices 6, 14, 50 and 52 does not infringe Devex's patent Claim 4. G.M. first argues that TKKP and TSP are not borax equivalents. The Master properly found, however, that they were such good equivalents that G.M. regularly substituted the use of one for another. G.M.'s main argument is that TKKP and TSP do not meet the terms of Claim 4 because they are not "meltable at a temperature below the melting point of the ferrous metal phosphate" coating. In support of its argument, G.M. claims that while ferrous metal phosphate coatings melt below 1050°C, pure TKKP melts at 1109°C. and pure TSP melts at 1340°C. G.M.'s argument suffers two weaknesses. First, it is unclear that ferrous metal phosphate coatings do not melt at some higher temperature. Moreover, it is unclear that TKKP and TSP, as they are used in the involved practices, melt at the elevated temperatures that G.M. claims. TKKP and TSP are not pure, but are mixed with phosphate and soap. As the

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[32] Master's Report, pp. 9-16.

Master found, this causes TKKP and TSP to melt at lower temperatures, far below the temperatures at which the phosphate coating melts. This finding is well supported by experiments, including several in which objects coated with phosphate and TKKP and TSP were heated to a temperature well below 1050° C. Although the TKKP and TSP melted, the phosphate coating did not. Accordingly, the Court finds that the Master's findings on these issues are not clearly erroneous.

G.M. next argues that the Master's royalty assessment was overly generous, suggesting that values approaching a few hundred thousand dollars might be more reasonable. G.M's several proposed figures derive from a 1955 assignment, a 1956-57 licensing offer, a partial assignment in 1964 and some 1968 settlements. The problem with G.M.'s argument is that these various events are insufficiently relevant to determine what the major infringer of Devex's patent should pay to use a process which was known to be validly patented. Thus, the 1955 assignment and the 1956-57 licensing offer came before it was known that Devex's patent was valid; the partial assignment in 1964 likely involved many contingencies, including the time and money that would be required to tap the patent's true value and the 1968 settlements included marginal infringers against whom it might have been uneconomical to litigate the issues of their infringement fully. G.M. finally relies upon a 1970 estate tax valuation. This Court doubts that the circumstances controlling the negotiations between IRS agents and attorneys for an estate holding an approximately one-ninth interest in a patent are sufficiently similar to those which would control the negotiations between Devex and G.M. to merit much attention. Accordingly, the Court follows the Master's lead and rejects G.M.'s proposed valuations.

G.M. next attacks the Master's award of pre-judgment interest to Devex. G.M.'s argument lacks merit. The purpose of

this accounting is to determine the reasonable royalty for G.M.'s infringement. This royalty should approximate the actual royalty G.M. would have been paid had it been able to reach some accord with Devex. The Court calculated this royalty based on payments coinciding with G.M.'s use of Devex's patent. G.M.'s payments did not follow this schedule. Indeed, G.M. has yet to pay anything. Thus, it must now be charged a premium for the additional benefit it has enjoyed from retaining the use of the royalty money over the many years since its first infringement. To do otherwise would systematically undercompensate patentees and encourage their infringers to continue fighting lawsuits long after the disappearance of any justification for doing so for the sole purpose of gathering in generous interest money that rightfully belongs to someone else.

The Court, therefore, approves the payment of interest, and it further approves the computation of such interest at the corporate bond rate as recommended by the Master. The Master, however, calculated interest on the amount of his recommended award through October 31, 1979 only. The interest calculation, thus needs to be revised to account for this Court's changes and updated to the date when, after all appeals have run their course, G.M. pays for its infringement. The Court is hopeful that the parties, modeling the Master's calculations, will be able to agree without further assistance upon Devex's due. Should they be unable to do so, the Court will call upon the Master's able assistance.

COSTS

Remaining to be discussed is the division of costs, a topic which the Master did not treat. Rule 54 provides that "costs should be allowed as of course to the prevailing party." A prevailing party is the party which, although it might not sustain all of its claims, receives a favorable judgment.[33] Rule 54 further provides that a court may, in the exercise of sound discretion, vary this rule, but the situations in which this is done appear to be limited, involving unnecessary delay or only slight success on the part of the prevailing party, etc.[34] In this case, Devex has done no worse than fully litigate its claims achieving a large judgment in its favor. The Court, thus, sees no reason for relieving G.M., whose infringement necessitated this case, from the normal responsibilities of a wrongdoer.

G.M. asks, however, that at least a portion of the Master's fee be taxed to Devex. Costs of reference are treated as costs within the meaning of Rule 54.[35] Although courts are empowered to treat differently the payment of masters' fees and the payment of other costs,[36] the Court sees no reason for doing so here. Consequently, it will order G.M. to pay the Master's entire fee.

Any issues not addressed by this Opinion have nevertheless been considered by the Court and found to be without merit.

Submit Order.

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[33] 6 J.Moore, Federal Practice, ¶54.70[4] (2d Ed. 1980).

[34] 6 J. Moore, Federal Practice, ¶54.70[5] (2d Ed. 1980).

[35] Dyker Building Co. v. United States to use of Parreco, 182 F.2d 85 (D.C. Dir. 1950).

[36] 5A J. Moore, Federal Practice, ¶53.04[1] (2d Ed. 1980).

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

DEVEX CORPORATION, et al., *Plaintiffs,*	)	
v.	)	Civil Action No. 3058
GENERAL MOTORS CORPORATION, *Defendant.*	)	

FINAL JUDGMENT

This cause having been referred to a duly appointed Special Master, after the Court of Appeals for the Seventh Circuit held Claim 4 of Henricks patent No. Re. 24,017 ("Claim 4") valid (321 F2d 234 [1963]) and after the Court of Appeals for the Third Circuit held that defendant had infringed Claim 4 (467 F2d 257 [1972]), to determine which of defendant's non-adjudicated accused practices infringed Claim 4 and to set a reasonable royalty that defendant should pay for its infringement; and the Special Master, after due pretrial discovery and hearing, having filed his Report on February 7, 1980; and the parties having filed and briefed their respective objections to the Report; and the Court, after due consideration, having rendered its Opinion thereon on August 22, 1980,

NOW, THEREFORE, for the reasons set forth in the Court's aforesaid opinion,

It is hereby ORDERED, ADJUDGED, and DECREED that:

1. (a) The Special Master's determination, that it is the law of the case that each of the three prior trial practices ("Bonderlube 246", Pontiac bumper forming process, and "Bonderlube 235", valve lifter plunger forming process and rocket forming process), which were before the Court of Ap-

peals for the Third Circuit, were ruled by it to infringe Claim 4, is hereby adopted.

(b) The Special Master's findings, that the accused practices numbered 4, 5, 7, 9, 12, 13, 16, 17, 22, 25 (piston rings and piston studs), 26, 27, 28, 30, 31, 36, 37, 38, 42, 47, 48, 49, 51, 54, and 56 infringed Claim 4, are hereby adopted.

(c) The Special Master's findings, that tetrapotassium pyrophosphate (TKPP) and trisodium phosphate (TSP) were borax equivalents, hence accused practices numbered 6, 14, 50, 52, and 53 infringed Claim 4, are hereby adopted.

(d) The Special Master's findings, that accused practices in which borax or equivalent rinses were used did not infringe, are rejected; and it is hereby found that accused practices numbered 1 (before 1964), 18, 23, 24, 29, 32, 43, 55, 57 and 58 infringed Claim 4.

(e) The Special Master's findings that Claim 4 requires cleaning as an integral step of its process, and hence accused practices numbered 2, 3, 10, 11, 15, 19, 20, 21, 25 (piston rods), 33, 34, 35, 39, 40, 41, 44, 45 and Oldsmobile Sun Gears, all of said practices involving little or no cleaning, did not infringe Claim 4, are hereby adopted.

(f) The Special Master's findings, that accused practices numbered 1 (after 1963), 8, and 46 did not involve the use of borax or equivalents, and therefore that they did not infringe Claim 4, are hereby adopted.

2. (a) The Special Master's finding of the reasonable royalty payable by defendant on its infringing bumper manufacture is modified by increasing the amount from $5,731,455.80 to $8,813,945.50.

(b) The Special Master's findings that plaintiffs had failed to prove the level of damages to which they were entitled for defendant's infringement in the manufacture of non-bumper

parts, and that the infringing process was of "relatively slight importance" to defendant in such manufacture, are hereby adopted.

(c) The Special Master's finding and recommendation, that defendant be required to pay interest on the reasonable royalty from respective year-end dates of infringement to date of judgment at prevailing corporate bond rates, are hereby adopted and approved.

(d) The Special Master's finding and recommendation, rejecting plaintiffs' claim for multiple damages and attorney's fees, are hereby adopted and approved.

3. Plaintiffs are hereby allowed their costs, to be taxed against defendant; defendant shall pay the entire fee of the Special Master as part of said costs.

4. Any issues not addressed by this Court's opinion have nevertheless been considered by this Court and found to be without merit.

5. Defendant General Motors Corporation shall pay to Plaintiffs:

(i) $8,813,945.50 plus prejudgment interest in the amount of $10,912,291.05 (which represents interest through August 31, 1980) totalling $19,726,236.55; plus prejudgment interest of $3,071.22 for each day thereafter up to and including the date of entry of this judgment;

(ii) plus postjudgment interest "from the date of entry of this judgment at the rate allowed by State law" as provided by 28 USC 1961.

(iii) with costs.

/s/ Caleb M. Wright
United States District Judge

Dated: October 6, 1980.

UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

Nos. 80-2550 and 80-2551

DEVEX CORPORATION, TECHNOGRAPH, INC., WILLIAM C. McCOY, THEODORE A. Te GROTENHUIS, FREDERICK B. ZIESENHEIM, MARJORIE Te GROTENHUIS, WILLIAM C. McCOY, JR., and KATHERINE M. BASSETT

v.

GENERAL MOTORS CORPORATION

Devex Corporation, Technograph, Inc., William C. McCoy, Jr., individually and as Executor of the Estate of William C. McCoy, deceased, Theodore A. Te Grotenhuis, Frederick B. Ziesenheim, Marjorie Te Grotenhuis, and Katherine M. Bassett,
Appellants in No. 80-2550

General Motors Corporation,
Appellant in No. 80-2551

APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

D.C. Civil No. 3058

Argued September 18, 1981

Before: GIBBONS, HUNTER, *Circuit Judges*
and STERN,* *District Judge*

(Opinion filed December 15, 1981)

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*Honorable Herbert J. Stern, United States District Judge for the District of New Jersey, sitting by designation.

OPINION OF THE COURT

HUNTER, *Circuit Judge.*

1. Plaintiffs charge defendant with massive patent infringement. The patent ("Claim 4," "Devex patent," "Henricks process") which is at the root of this litigation provides as follows:

> The process of working ferrous metal which comprises forming on the surface of the metal a phosphate coating and superimposing thereon a fixed film of a composition comprising a solid meltable organic binding material containing distributed there through a solid inorganic compound meltable at a temperature below the melting point of the ferrous metal phosphate of said coating and having a hardness not exceeding 5 on the Mohs' hardness scale, and thereafter deforming the metal.

This process is used in cold forming metal car parts by pressure.

> The happy result of [the Devex] process is that phosphate, soap and borax work to lubricate the pressure-forming operation, preventing harmful contact between the metal products and the machinery with which they are formed. . . . [The Devex process] is especially beneficial because it may be easily cleaned from the metal product following its formation.

Devex Corp. v. General Motors Corp., 494 F. Supp. 1369, 1372 (D. Del. 1980). The Devex patent expired in 1969; thus, only damages issues are before us.

2. This litigation, which began twenty-five years ago, is now in the accounting phase. Defendant and plaintiffs cross-appeal from the judgment of the district court, which was based in part on the report of a Special Master. For the reasons which follow, we will affirm.

I. Procedural History

3. The complaint in this case was filed November 13, 1956 in the Northern District of Illinois. After a trial, Judge Robson of that court held on February 1, 1962 (final judgment entered June 29, 1962) that the Devex patent was invalid. The United States Court of Appeals for the Seventh Circuit reversed, *Devex Corp. v. General Motors Corp.*, 321 F.2d 234 (7th Cir. 1963), *cert. denied*, 375 U.S. 971 (1964), and held that the patent was valid because "the elements which Henricks selected were put together in a new way and achieved a new and unexpected result." 321 F.2d at 236. The court further stated:

> There is substantial evidence in the record to prove that a new coaction between the soap, borax and phosphate occurred during the drawing process. Friedberg's tests showed that in the Henricks' process, new compounds are formed; the formation of insoluble organic compounds is inhibited, and the abrasive phosphate is transformed into a glassy amorphous compound having highly effective lubricating properties.

321 F.2d at 237. In other words, the use of a borax and soap combination in conjunction with phosphate resulted in improved lubrication of the metal during the deforming (cold forming by pressure) process and in improved cleanability of the product after its formation. The improved lubrication and cleanability combined to make the process patentable.

4. The court of appeals remanded the case for further proceedings. At that point, General Motors moved to have the case against it transferred to Delaware, and its

motion was granted. *Devex Corp. v. General Motors Corp.*, 146 U.S.P.Q. 346 (N.D. Ill. 1965).[1]

5. Judge Wright of the United States District Court for the District of Delaware ruled in 1967, in the suit between Devex and General Motors, that summary judgment in favor of plaintiffs on the issue of infringement was inappropriate. *Devex Corp. v. General Motors Corp.*, 263 F.Supp. 17 (D.Del. 1967). In 1968, he granted a motion by Devex for permission to amend its complaint to assert the doctrine of equivalents. *Devex Corp. v. General Motors Corp.*, 285 F. Supp. 109 (D.Del. 1968).[2]

6. After an infringement trial, Judge Wright ruled that the patent had not been infringed by General Motors. 316 F.Supp. 137€ (D.Del. 1970). That ruling was reversed by this court. *Devex Corp. v. General Motors Corp.*, 467 F.2d 257 (3d Cir. 1972), *cert. denied*, 411 U.S. 973 (1973). We rejected the district court conclusion "that infringement was not proved because Devex failed to establish that General Motors achieved the unexpected results that made the Henricks combination patentable." 467 F.2d at 260. After examining the materials before us, we concluded that the accused practices led to satisfactory lubricity and cleanability, which meant that those practices infringed. We specifically rejected General Motors' contention that, because the chemical reactions involved were arguably different from those taught by the Henricks patent, the General Motors practices did not infringe.

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1. After the transfer of the case against General Motors to Delaware, Judge Robson in Illinois granted summary judgment for plaintiffs on the infringement issues. Devex Corp. v. Houdaille Industries, Inc., 148 U.S.P.Q. 74 (N.D. Ill. 1965). The Court of Appeals reversed, 382 F.2d 17 (7th Cir. 1967), and the suit against Houdaille was thereafter settled.

2. Judge Wright resolved a discovery dispute at 275 F.Supp. 310 (D.Del. 1967).

> [I]f it is directly determinable that the two lubricants have essentially the same components, are applied in the same way and that the results of their use are essentially the same, the disputation of chemists about the chemical interactions that occurred in the processes cannot be decisive.
>
> Moreover, it may well be that chemical reactions differed in degree, and perhaps in kind as well, in different applications of the Henricks process. Claim 4, even as restricted and held valid in the Seventh Circuit, covers and protects the combination of soap and borax in proportions to be varied according to the nature and difficulty of the draw to be facilitated so that the process will yield its claimed advantages over a wide range of drawing pressures and temperatures. It is not claimed that in every Henricks mix under every temperature, chemical reaction and its products will be identical. Thus, if one accepts as persuasive the testimony of GM experts that reactions and substances produced during the GM drawings were not identical with those that the Henricks process is said to have produced using different proportions of ingredients under different pressures at different temperatures, it does not follow that GM practice failed to produce the results that made the Henricks process patentable.
>
> In these circumstances, the demonstrated effectiveness of GM practice in producing the satisfactory drawing and ease of cleaning that Henricks had achieved must prevail over any contrary inference drawn from disputed expert testimony as to comparative chemistry in what may well not have been equivalent situations.

467 F.2d at 261-62. Thus, because the results produced by the accused practices were identical to those produced by the Devex patent, the accused practices infringed. The differences between the specific chemical

processes of the Devex patent and those of the accused practices were not determinative, so long as the results were identical.

II. Issues Now on Appeal

A. *The Special Master's Report*

1. *Infringement Issues*

(a) *Borax-based lubricants*

7. Based upon our prior opinion, 467 F.2d at 261, the Special Master ruled that the accused practices which involved the use of borax-based lubricants (soap and borax) in cold forming bumpers and non-bumpers infringed the Devex patent, where the use of those lubricants led to cleanability in conjunction with lubricity, and where the advantages of both the cleanability and lubricity were used by General Motors. Thus, the Special Master concluded that accused bumper practices 4, 5, 12, 13, 36, 48, 49, 51, and non-bumper practices 7, 9, 16, 17, 22, 25 (in part), 26, 27, 28, 30, 31, 37, 38, 42, 47, 54 and 56 infringed the Devex patent. Special Master's Report at 27; Appendix at 287.

(b) *TKPP and TSP substituted for borax in lubricants*

8. The Special Master also ruled that General Motors' use of tetrapotassium pyrophosphate (TKPP) as a borax substitute in bumper making (accused practices 6, 14, 50, 52, and 53) and of trisodium phosphate (TSP) as a borax substitute in non-bumper making (accused practices 3, 11, 15 and 45) infringed the Devex patent. Special Master's Report at 29-38; Appendix at 289-298.

9. The Special Master found as a fact that "TKPP was put in [to the lubricant] as a borax substitute, to help the soap do the job of efficiently lubricating the

workpiece." Special Master's Report at 31; Appendix at 291. General Motors argued that the use of TKPP did not infringe the patent because pure TKPP melts at a higher temperature than the ferrous metal phosphate coating, which meant that TKPP did not fit the literal language of the patent. The Special Master rejected that argument, found as a fact that TKPP, when mixed in the coatings and as a matter of actual practice, melts before the ferrous metal phosphate coating, and concluded that the use of TKPP as a borax substitute to improve lubricity and cleanability therefore infringed the Devex patent. Special Master's Report at 32-37; Appendix at 292-297. The Special Master also found that TSP (accused practices 3, 11, 15, 45) has a lower melting point than the ferrous metal phosphate coating, and that if it were used as a borax substitute to obtain improved lubricity and cleanability it would infringe the Devex patent. Special Master's Report at 37-38; Appendix at 297-98.

(c) *Accused practices involving no actual cleaning*

10. The Special Master held that accused practices 2, 3, 10, 11, 15, 19, 20, 21, 25 (in part), 33, 34, 35, 39, 40, 41, 44 and 45 did not infringe the Devex patent. Some of those practices involved little or no actual cleaning of the part after its formation; some involved a cleaning process which, unlike the easy cleaning process used on borax-treated parts, would have removed the residue even if the Devex process had not been used. Because "ease of cleaning is an element vital to the life of the patent," the Special Master held that those practices which do not involve cleaning of the part cannot infringe the patent. Special Master's Report at 39-43; Appendix at 299-303.[3]

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3. None of the accused practices using TSP involved cleaning. Special Master's Report at 43; Appendix at 303.

(d) *Borax Rinses*

11. Accused Practices 1, 2, 8, 18, 20, 23, 24, 32, 34, 35, 39, 43, 55, 57 and 58 allegedly involved the use of a neutralizing rinse (as opposed to a lubricant) containing borax.[4] The Special Master concluded that the use of rinses containing borax did not infringe claim 4, for the following reasons:

i) There was no evidence that borax (or equivalent) rinses were used to lubricate the metal or to aid in cleaning. Special Master's Report at 46; Appendix at 306.

ii) The borax was used solely to neutralize acid carryover resulting from the phosphate bath. Numerous other techniques which did not involve borax were also used to achieve this result. Special Master's Report at 46-47; Appendix at 306-07.

iii) Example XXXV in the 1950 Henricks patent application set forth the use of a borax rinse to neutralize the acid. Example XXXV was cancelled by Henricks when the "patent examiner required that the specification be shortened and limited to 'such parts of it as are commensurate with claims that applicant will continue to prosecute.' " Moreover, Henricks testified that "neutralizing rinses were old and well known." Special Master's Report at 47-48; Appendix at 307-08.

iv) Henricks did not invent the use of borax as a neutralizing rinse. Special Master's Report at 48-49; Appendix at 308-09.

v) Defendant thought it was using borax rinses to neutralize acid, and not for lubrication or cleanability. Defendant used non-accused rinses as well as accused

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4. Accused Practice 29 involved using TSP as a neutralizing rinse. The analysis applicable to the borax-containing rinses applies to Accused Practice 29 as well, and also applies to any rinse practices which contained the infringing borax substitutes (TKPP and TSP).

rinses, and easily shifted back and forth. Special Master's Report at 49-50; Appendix at 309-10.

vi) Plaintiffs could have, but did not, contend that certain of the borax rinse processes infringed the patent prior to and at the infringement trial. Special Master's Report at 50; Appendix at 310.

vii) It would make no sense for defendant to seek the benefits that the borax-containing lubricant could provide in a rinse, rather than by the use of the borax-containing lubricant. Special Master's Report at 51; Appendix at 311.

(e) *Accused Practices 1, 8 and 46*

12. Plaintiffs argued that Accused Practices 1, 8 and 46 involved the use of borax, and that they infringed Claim 4 for that reason.

13. The Special Master discussed the factual question of whether Accused Practices 1, 8 and 46 contained borax at pages 53-59 of his report (Appendix at 313-319), and, after weighing the evidence adduced by each side, concluded that they did not.

2. *Damages Issues*

(a) *Multiple Damages and Attorney's Fees*

14. The Special Master ruled that an award of multiple damages and of counsel fees would be inappropriate in this case. "[T]wo highly respected jurists [Judges Robson and Wright] have reached the selfsame conclusions for which plaintiffs now accuse defendant of bad faith." Special Master's Report at 67-68; Appendix at 327-28. The Special Master also found explicitly that defendant had not been guilty of bad faith. Special Master's Report at 70; Appendix at 330.

(b) *Infringement in Bumper-Making: Facts*

15. Title 35 U.S.C. §284 provides in part:

> §284. Damages
>
> Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court.

The Special Master, noting that plaintiffs were not themselves the manufacturers, ruled that damages would take the form of a reasonable royalty, and that the royalty would be ascertained "by reference to hypothetical negotiations." Special Master's Report at 71; Appendix at 331.

16. The Special Master first examined the Devex patent as used in bumper making. The Oldsmobile division of General Motors, throughout the life of the Devex patent, cold formed bumpers without infringing the Devex patent. The Special Master thus found as a fact that "Oldsmobile was successful in cold forming bumpers without the use of the Henricks process during the entire life of the patent." Special Master's Report at 77; Appendix at 337. "To sum up, Oldsmobile's experience shows it was commercially practicable throughout the life of the Henricks patent to cold form bumpers without utilizing the Claim 4 process." Special Master's Report at 79; Appendix at 339.[5]

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5. During 1962 and 1963, Oldsmobile used Accused Practice 43 (a rinse). The conclusion that Oldsmobile at no time infringed the patent thus depends upon the ruling that the use of rinses did not infringe the patent. However, even if accused Practice 43 infringed the patent, Oldsmobile used non-infringing processes to make the vast majority of its bumpers (all except those made in 1962 and 1963), and the Special Master's factual conclusion that Oldsmobile successfully cold formed bumpers without the Devex process remains sound.

17. Bumpers at the Chevrolet division of General Motors were hot forged until 1954. In 1954, a new plant began cold forming bumpers for Chevrolet; the lubricant used was plain soap over phosphate. Bumper production was satisfactory without borax or an equivalent.

18. By 1957-58, Chevrolet was experiencing plating problems,[6] and in November 1958, Chevrolet switched to a lubricant which contained borax and infringed the Devex patent. From November 1958 to mid-January 1965, Chevrolet used infringing processes (containing borax) to manufacture 93% of its bumpers. Chevrolet used non-infringing processes to a limited extent (7%) during that period. From 1965 until the patent expired, Chevrolet used infringing processes (containing TKPP) to cold-form approximately 84% of its bumpers. In sum, the Special Master found that Chevrolet used the Devex process because Chevrolet thought the Devex process was *better*, but rejected plaintiffs' contention that the Devex process was *essential*. In reaching this conclusion, the Special Master carefully weighed conflicting testimony. Special Master's Report at 79-91; Appendix at 339-351.

19. The Pontiac division of General Motors used a plastic coating (non-infringing) process in making its bumpers from 1952-1955. From late 1955 through the 1968 model year, Pontiac used infringing processes to make its bumpers, with the exception of the 1956 model year, during which Pontiac used the plastic spray for some of its bumpers. In August 1968, Pontiac switched to a non-accused process. Special Master's Report at 91-96; Appendix at 351-356.

20. The Special Master found that the Henricks process in use at Pontiac was superior to non-infringing practices, but that the Henricks process was "not

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6. Bumpers must be cleaned prior to plating; if the cleaning is inadequate, the plating will be likewise.

indispensable." Special Master's Report at 97 & n., Appendix at 357 & n.. After weighing conflicting evidence, the Special Master concluded that "Henricks' lubricants came to be regarded by Pontiac as more satisfactory, but others would have done the job." Special Master's Report at 98; Appendix at 358.

21. The Cadillac division of General Motors cold formed its bumpers from 1952 through the 1962 model year without infringing the Devex patent. Cadillac switched to the Devex process in the 1962 model year, and used it until July 1968 for 100% of its bumpers. In 1968, Cadillac switched to a non-infringing practice. Again, the Special Master found that the Henricks process resulted in benefits to General Motors, but that it was not essential. Special Master's Report at 100-01; Appendix at 360-61.

22. At Fisher Body-Elyria Bumper Parts, General Motors infringed the patent from April 1957 through March 1960. Non-accused or non-infringing practices were used at all other times relevant to this suit. Special Master's Report at 101-02; Appendix at 361-62.

23. The Special Master's factual finding as to infringement in bumper making, in sum, is that the three major infringing divisions (Pontiac, Chevrolet and Cadillac) used the Henricks process because it was better than non-infringing alternatives, but not because it was essential or because there were no commercially viable non-infringing alternatives available. Indeed, Oldsmobile's experience proves the availability of practicable alternatives. There were periods when one or more of the infringing divisions used nonaccused or non-infringing practices. This leads inexorably to the factual conclusion that non-infringing cold forming alternatives to the Devex process existed: if there had been no choice, defendant would have infringed the patent 100% of the time.

(c) *The Reasonable Royalty: Bumpers*

24. Plaintiffs sought as a royalty for bumper infringement a percentage of the sale price of the bumpers. The percentage plaintiffs sought depended upon their factual contention that the Devex process was essential to defendant's cold forming of bumpers. The Special Master rejected plaintiffs' premise when he found as a fact that non-infringing, commercially practicable cold forming processes existed. He also rejected the royalty rates proposed by General Motors, which were based in the alternative on the cost of the lubricants, the sale price of the patent, the value given the patent for estate tax purposes, settlements reached by plaintiffs with other infringers, and the royalty rate which the owners of the patent charged a company owned by the same persons who owned the patent at the time.

25. The Special Master decided to base the reasonable royalty on an offer made by plaintiffs in 1964 to license the patent for three quarters of one percent (.75%) of the sale price of the bumpers. The Special Master postulated hypothetical negotiations, stressed the availability of viable alternatives to the Devex patent, added that Oldsmobile produced bumpers without the Devex process but that Chevrolet, Pontiac and Cadillac were loyal to the Devex process, noted that the Devex process did have a considerable value, and ultimately reduced the .75% figure — which he decided would have been plaintiffs' opening offer — by approximately one-third.

(d) *Infringement in Non-Bumper making: Facts and Reasonable Royalty*

26. Plaintiffs argued before the Special Master that defendant's choice was between "cold forming non-bumper parts through Henricks, or not cold forming at all." Special Master's Report at 103; Appendix at 363. The Special Master rejected this contention, and

> [found] the fact to be that non-bumper parts could be and very often were, cold formed by defendant without the use of Henricks. Indeed the question does not even seem to me to be a close one. The evidence is that, far from dominating the field, the Henricks process had relatively slight importance to defendant in the production of non-bumper extruded parts.

Special Master's Report at 104; Appendix at 364.

27. The Special Master then examined the impact of this conclusion on plaintiffs' damages claims for non-bumper infringement. Plaintiffs sought a percentage of the difference between the cost of producing non-bumper parts by machining or hot forging and by using the Devex process. The Special Master noted that a reasonable royalty cannot be based on speculation, although "a fair approximation based on the evidence will suffice." Special Master's Report at 111; Appendix at 371. He continued:

> By relying in their savings-and-gains proof solely on the (erroneous, as I have found) premise that defendant could have cold formed non-bumper parts only through Henricks, plaintiffs have offered no evidence on which a royalty might be reasonably based.

Special Master's Report at 111-12; Appendix at 371-72. Although there had been sufficient evidence with regard to bumpers to supply a fall-back position (the .75% offer), there was no such alternative presented with regard to non-bumper parts, and plaintiffs were therefore not entitled to royalties on the non-bumper infringement of the patent.

(e) *Interest*

28. The Special Master awarded interest "as a matter of fact," after finding that the hypothetical bargainers would arrange for interest as part of the reasonable royalty. Special Master's Report at 140-41; Appendix at 400-01. He also ruled that plaintiffs were entitled to prejudgment interest (delay damages) at the prevailing corporate bond rate as a matter of law, and that that interest should be calculated each year based on the number of infringing parts made in that year.

B. *The District Court Opinion*

29. The district court, turning first to plaintiffs' claims of error, affirmed the ruling of the Special Master that "[p]ractices as to which little or no cleaning was required do not infringe." 494 F.Supp. at 1375. The trial court interpreted prior decisions in the Devex litigation as "holding that Claim 4 requires cleaning as an integral step of its process." *Id.* at 1373. The court stated:

> The primary importance of Devex's process was not that the addition of borax somehow enhanced lubricity. Rather, the addition of borax inhibited the formation of zinc stearate resulting in products that could be easily cleaned. [In the validity phase of this litigation], Devex . . . relied upon the ease of cleaning to defend the validity of what would otherwise have been an overly broad claim.

494 F.Supp. at 1374-75.

30. The trial court then turned to the issue of whether borax rinses infringed the Devex process. He ruled that the borax rinses did infringe the patent, but only where the parts formed after the rinse was applied were cleaned. In other words, if the rinse performed the same role as the lubricant, it infringed the patent.

31. The trial court affirmed the Special Master's fact finding that accused practices 1, 8 and 46 did not infringe, noting that the "clearly erroneous" standard of

review applied under Fed. R. Civ. P. 53(e)(2), and that the Special Master had "meticulously reviewed and resolved this evidentiary dispute . . . ." 494 F.Supp. at 1376.

32. The trial court then turned to the reasonable royalty rate. The court agreed with the Special Master's findings that

> . . . Oldsmobile used non-infringing practices to make almost all of the bumpers. Similarly Chevrolet relied, though less successfully, upon non-infringing processes until November, 1958, and used non-infringing processes to manufacture part of its bumper needs from 1960 to 1963 and from 1965 to 1966. Cadillac used non-infringing processes prior to 1962 and after 1968. Fisher Body used non-infringing processes prior to 1957 and after 1960. Where G.M.'s various divisions so often produced marketable cars without using Devex's process, the Court finds, as the Master did also, that G.M.'s negotiators would not have agreed to the high figure Devex now proposes.

494 F.Supp. at 1376-77. The court disagreed, however, with the reduction in the .75% licensing offer, and ruled that in the absence of evidence tending to show that Devex would accept a figure less than .75%, the reduction was improper because speculative. Thus, the court accepted .75% of the sale price as the royalty for bumper infringement.[7]

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7. The trial court awarded plaintiffs $8,813,945.50 in royalties; $10,912,291.05 in prejudgment interest for the period through August 31, 1980; $3,071.22 in prejudgment interest for each day from (and including) September 1, 1980 *through* October 6, 1980 (the day the final judgment was entered); post-judgment interest at the rate allowed by state law from October 7, 1980 until payment of the award to plaintiffs by defendant; and costs. Final judgment at 3-4; Appendix at 467-68.

33. The court affirmed the Special Master's refusal to award royalties for non-bumper infringement:

> In this case, the Master painstakingly reviewed the benefits of Devex's process versus those of other non-infringing pressure forming operations. He found that G.M.'s various divisions easily substituted non-infringing processes to manufacture non-bumper parts. Apparently, then, Devex's process was of "relatively slight importance to" G.M., and for this reason the Master properly found that G.M. should not be required to pay anything for its infringement in the manufacture of non-bumper parts.

494 F.Supp. at 1378.[8]

34. The trial court then turned to General Motors' claims of error. The court rejected General Motors' contention that this court, in discussing Bonderlube 235 in its prior opinion, intended only to reverse the judgment of non-infringement as to Bonderlube 235 and to leave the rest of the trial court judgment, which dealt with other compounds, intact. The trial court also rejected General Motors' contentions that TKPP and TSP did not infringe, that the royalty rate should have been based on other factors, that the Special Master should not have assessed prejudgment interest, and that General Motors should not be liable for costs (including the Special Master's fee).

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8. The trial court also rejected plaintiffs' claim for multiple damages and attorney fees.

C. *Issues now on appeal to this court*

35. Plaintiffs make the following arguments on appeal to this court:

i. The award of a royalty of .75% of bumper sales was unconscionably low. The Special Master and the trial court erred in finding that there were reasonable alternatives to the Devex process available to defendant. Not only were the fact findings of the lower courts clearly erroneous, but also the court and the Special Master erred as a matter of law in disregarding (or refusing to rely upon) plaintiffs' evidence of savings attained through use of the Devex process. The lower court further erred as a matter of law in not relying upon plaintiffs' evidence of savings, because defendant did not refute plaintiffs' showing that there were no alternatives available to General Motors at the time the infringement began which would have yielded results equally beneficial to the results given by the Devex process.

ii. The finding that accused practices 8 and 46 did not contain borax or TKPP was clearly erroneous. Moreover, that defendant admitted that accused practice 46 infringed the patent.

iii. The Special Master and the trial court erred as a matter of fact and of law in refusing to award royalties for non-bumper infringement. The finding that there were alternatives available to General Motors which would give equally beneficial results was clearly erroneous. Moreover, the patent laws require the award of a reasonable royalty where infringement has taken place; thus, to refuse to award damages in a case such as this one, where massive infringement occurred, is erroneous. Finally, General Motors failed to rebut plaintiffs' showing as to what the savings resulting from infringement were, and failed to show that there were in fact alternatives available to General Motors at the time infringement began which would yield equally beneficial results to the Devex process.

iv. The Special Master and the trial court erred in construing the prior opinions written in this case as requiring that a part formed by the Devex process actually be cleaned in order for infringement to have occurred. Attaining the result of cleanability is enough to warrant a finding of infringement, even though the part is not actually cleaned.

36. Defendant raises the following contentions on this appeal:

i. It is erroneous for a court to award prejudgment interest on a reasonable royalty award where the amount of the award was unliquidated until judgment was entered, and in the absence of special circumstances.

ii. The law of the case has restricted the Devex patent to those processes which involve the use of borax. Thus, plaintiffs cannot now argue that the use of TKPP and TSP infringes the patent, both because of the law of the case and because plaintiffs earlier waived the right to assert the doctrine of equivalents.

iii. The Special Master was correct in ruling that the use of rinses which contain borax or its equivalents does not infringe the patent, because the law of the case requires that the use of the Devex patent be for the purposes of attaining lubricity and cleanability, and the use of the rinses has a different purpose entirely. Thus, the district court erred in ruling that the use of the rinses infringes the Devex patent.

iv. The choice by the Special Master of the .75% royalty rate, and his subsequent reduction of that figure by one-third, was erroneous because the correct figure was one of the alternatives suggested by defendant. The increase by the trial court of the rate to the .75% figure compounded the error.

III. Discussion

A. *The Standard of Review*

37. In patent infringement cases, "[t]he awarding of damages involves a subtle judicial function; the statute allows considerable latitude [to the fact-finding court]." *John Zink Co. v. National Airoil Burner Co.*, 613 F.2d 547, 559 (5th Cir. 1980). *See also Milgo Electronic Corp. v. United Business Communications, Inc.*, 623 F.2d 645, 663 (10th Cir.), *cert. denied*, 101 S. Ct. 794 (1980) ("An appellate court must affirm the award if there is substantial record evidence to support it: the trial court's findings will not be set aside unless it is shown that they are clearly erroneous.")

38. The scope of a patent, which is determined by construing the patent, is a question of law. *Studiengesellschaft Kohle mbH v. Eastman Kodak Co.*, 616 F.2d 1315, 1324 (5th Cir.), *cert. denied*, 101 S. Ct. 573 (1980). However, "[t]he issue of patent infringement is a question of fact . . . ." *Id.* at 1322. Moreover, "patent cases, because they so frequently contain conflicts in expert testimony, seem particularly suited for Rule 52(a)'s review limitations [the clearly erroneous standard]." *Id.* at 1323.

39. The Special Master heard testimony during fifty-three days of trial. He wrote an exhaustive and thoughtful report, in which he set forth findings of fact based on a careful weighing of conflicting testimony as well as of documentary evidence. The trial judge, after a detailed analysis of the facts found by the Special Master, and after applying the standard of review set forth in Fed. R. Civ. P. 53(e)(2) (the "clearly erroneous" standard) to those fact findings, decided that none of the Special Master's findings of fact was clearly erroneous. We agree.

40. Whether the Special Master and the trial court ascertained and applied the law correctly to the facts is

subject to a less stringent standard of review than the "clearly erroneous" standard. We have concluded, however, that the Special Master and the trial court ascertained and applied the law correctly. The two differ in only two respects: first, the Special Master ruled that none of the accused rinse practices infringed the patent, while the trial court ruled that those accused rinse practices which involve no cleaning do not infringe, but that those which involve cleaning do infringe. Second, the Special Master reduced the .75% industry-wide offer figure by one-third, while the trial court reinstated the .75% figure. We agree with the results reached by the Special Master and the district court; where the two differ, we affirm the district court.

41. The scope of the Devex patent is largely a question of law. Thus, questions such as whether cleanability (as opposed to actual cleaning) is sufficient to bring a process within the patent are questions of law. The question of which of the accused processes infringed the patent is one of fact. Which processes involved actual cleaning, which processes involved the use of borax equivalents, and the like, are factual issues.

42. When it comes to review of the damages issues, such as whether plaintiffs proposed a reasonable standard of comparison upon which the court could have based a royalty award, identifying a question as one either of fact or of law becomes more problematic. At this point in this case, however, the reasonableness of a proposed standard of comparison is largely factual, because the answer depends upon factual issues, such as whether noninfringing alternatives were available to defendant. If such alternatives were available, it would weigh heavily against plaintiffs' proposed standard of comparison if that comparison depended upon the nonavailability of viable alternatives.

B. *Infringement Issues*

1. *Borax-based lubricants*

43. It is clear from prior opinions in this litigation and we reaffirm that the use of borax-based lubricants in cold forming bumpers and non-bumpers infringed the Devex patent where those lubricants contributed to cleanability and lubricity, *and* where General Motors took advantage of the lubricity and particularly of the cleanability in the actual manufacturing process. Ascertaining which of the accused practices fits this category then becomes a matter of fact. No effective challenge to the inclusion of accused practices in this category has been made.[9]

2. *TKPP and TSP Substituted for Borax in Lubricants: The Doctrine of Equivalents*

44. Plaintiffs have asserted the doctrine of equivalents with regard to defendant's use of TKPP and TSP as borax substitutes. In *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605 (1950), the Supreme Court discussed the doctrine of equivalents:

> The theory on which [the doctrine] is founded is that "if two devices do the same work in substantially the same way, and accomplish substantially the same result, they are the same, even though they differ in name, form, or shape." [Citation omitted.] The doctrine operates not only in favor of the patentee of a pioneer or primary invention, but also for the patentee of a secondary invention consisting of a

9. We reject as wholly without merit defendant's argument that this court, in its prior opinion in this case, intended to differentiate between processes using Bonderlube 246 and those using Bonderlube 235.

> combination of old ingredients which produce new and useful results . . . .

Id. at 608. The Court also established the standard of review applicable to the doctrine:

> A finding of equivalence is a determination of fact . . . . Like any other issue of fact, final determination requires a balancing of credibility, persuasiveness and weight of evidence. It is to be decided by the trial court and that court's decision, under general principles of appellate review, should not be disturbed unless clearly erroneous. Particularly is this so in a field where so much depends upon familiarity with specific scientific problems and principles not usually contained in the general storehouse of knowledge and experience.

Id. at 609-610.

45. "The 'doctrine of equivalents' which governs determinations of infringement requires an assessment of function rather than form in measuring the claims of a patent." *N.V. Maatschappij Voor Industriele Waarden v. A.O. Smith Corp.*, 590 F.2d 415, 421 (2nd Cir. 1978).

> A patented process is infringed only by unauthorized performance of substantially the same process steps in substantially the same way to accomplish substantially the same result. It is not necessary that the accused process be practiced with the same or substantially the same apparatus as disclosed by the patentee. [Citation omitted.] Nor is it necessary that the materials used in the process be identical to those disclosed and claimed as long as they are equivalent.

International Glass Co. v. United States, 408 F.2d 395, 400 (Ct. Cl. 1969). In *International Glass*, the accused practices did not infringe because

> they do not appropriate the gist of the claimed process; are not a mere variation of the details of the

> claimed process; and in fact do not substantially follow the mode taught by the patent.

Id. at 401.

46. "To establish equivalency for the purpose of showing infringement of a patent claim, the patentee has the burden of proving a real identity of means, operation, and result." *Ziegler v. Phillips Petroleum Co.*, 483 F.2d 858, 868 (5th Cir.), *cert. denied*, 414 U.S. 1079 (1973).

> [P]rinciples [of the doctrine of equivalents] are applied to compositions of matter where there is equivalence between chemical ingredients. [Citations omitted.] In [*Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605 (1950)] the Supreme Court spoke to the problem of determining what constitutes equivalency.
>
> > "Consideration must be given to the purpose for which an ingredient is used in a patent, the qualities it has when combined with the other ingredients, and the function which it is intended to perform."
> > *Graver, supra*, 339 U.S. at 609 . . . .

Id. at 869.

> In recognition of the fact that a patent would be virtually worthless if it did not protect against devices which incorporate only unimportant variations of the patented device, the doctrine of equivalents provides that a later-developed device will be regarded as the equivalent of the patented device if, although different in form or shape, it "performs substantially the same function in substantially the same way to obtain the same result." [Citation omitted.] In its early development, the doctrine generally was applied in cases involving the equivalence of devices having mechanical components. Today,

> however, the same principles are applied to compositions where there is equivalence between chemical ingredients. [Citation omitted.]

Chemical Cleaning, Inc. v. Dow Chemical Co., 379 F.2d 294, 296 (5th Cir.), *cert. denied*, 389 U.S. 1040 (1967). *See also Rich Products Corp. v. Mitchell Foods, Inc.*, 357 F.2d 176, 177, 182 (2d Cir.), *cert. denied*, 385 U.S. 821 (1966) (defendant infringed patent, where defendant substituted hydroxypropyl methyl, a cellulose, for the alkyl groups specified in the patent, the cellulose was one of the four essential ingredients in the patent, and the substitute chemical performed the same function as the chemical listed in the patent).

47. Here, the Special Master, in the role of fact finder, found, after weighing the evidence, that TKPP and TSP, when substituted for borax, produce the same results (cleanability and lubricity) that borax produces and fit the literal language of the patent in terms of melting point. Cleanability and lubricity are the results which made the Devex process patentable in the first place; thus, TKPP and TSP, which produce those results and which read on the literal language of the patent, infringe the patent. Certainly the fact findings here, that TKPP and TSP are equivalents of borax and infringe the patent, are not clearly erroneous.[10]

48. General Motors contends here that plaintiffs cannot claim the use of TKPP and TSP as infringements because plaintiffs insisted earlier in this litigation that

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10. Defendant argues that the coaction of TKPP (or TSP) with soap did not produce the same chemical by-products as borax in reacting with soap. That is irrelevant: TKPP and TSP produced the critical results of cleanability and lubricity when substituted for borax. In addition, TKPP and TSP fit the literal language of the patent. This case is thus distinguishable from Sealed Air Corp. v. U.S. International Trade Commission, 645 F.2d 976 (C.C.P.A. 1981), in which the accused process did not read on the literal language of the patent.

borax infringed, and are therefore estopped from asserting that anything other than borax infringed.

49. We disagree. We reject General Motors' contention that earlier opinions in this litigation which referred to the use of borax meant the exclusive use of borax and no other inorganic compound, and, for the reasons discussed herein, we affirm the rulings that the use of TKPP and TSP infringed the patent.[11]

3. *Accused Practices Involving No Actual Cleaning*

50. The validity of the Devex patent depended upon the new results of commercially practicable cleanability and enhanced lubricity. However, the precise question of whether cleanability or cleaning infringes the patent was not reached in either the validity or infringement phases. Where cleanability is irrelevant to the creation of the part involved, one of the factors which saved the Devex patent from invalidity is not present, and the patent has not been infringed. In other words, we hold that while one result which saved the patent is cleanability, a practice does not infringe unless it involves actual cleaning.

4. *Borax Rinses*

51. The Special Master ruled that borax rinses did not infringe the Devex patent, in part because they were

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11. It is arguable that General Motors has waived its right to make this argument. General Motors' contention that plaintiffs are estopped from alleging that anything other than borax infringes is essentially an argument that plaintiffs cannot assert the doctrine of equivalents. The trial court granted plaintiffs' motion to amend its complaint to assert the doctrine of equivalents *before* the first appeal to this court was taken. 295 F.Supp. 109 (D.Del. 1968). Defendant did not, apparently, raise the propriety of the trial court's action on that appeal, even though many, if not all the arguments which defendant makes now could have been raised in the context of the first appeal.

rinses used to neutralize acid, and were not designed to improve lubricity or cleanability. The trial court agreed that borax rinses did not infringe where they were used solely to neutralize acid, but disagreed with the Special Master's reasoning insofar as it excluded from infringement those rinse practices which were, in fact, used to promote cleaning.

52. We agree with the trial court. That the soap and borax (or equivalent) may be applied to metal in a series of steps, rather than in a combined form, or as a rinse rather than a lubricant, is not determinative of whether a particular practice infringes or not. What *is* determinative is the result produced and the use to which that result is actually put. Where soap and borax are applied to the metal seriatim, instead of in a combined form, the process infringes the Devex patent where cleanability and its effects are put to use in the actual process.[12]

5. *Accused Practice 46*

53. As did the trial court, we conclude that the fact findings made by the Special Master were not clearly erroneous, and affirm the Special Master and the trial court with regard to Accused Practice 46, which did not infringe the patent.

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12. The decisions of the Special Master and of the trial court are not really inconsistent with each other or with prior rulings in this litigation. In connection with the accused practices which involved little or no cleaning, both agreed that only those practices which involve commercially practicable cleaning could infringe the patent. The Special Master and the trial court agreed that where rinse practices were used solely to neutralize acid, those practices did not infringe the patent. The Special Master and the trial court disagreed only as to those rinse practices which involved actual cleaning. The trial court carried out the logic discussed in Part III (B)(4) *supra* in its ruling; the Special Master applied a strict reading of the patent in reaching his result.

C. *Damages Issues*

54. We now turn to the question of what damages plaintiffs should receive from defendant.

1. *Bumpers*

55. The Special Master concluded, based upon facts found by him, that the Devex process was useful in but not essential to the cold forming of bumpers. We agree that the facts lead to that conclusion.

56. Oldsmobile only infringed the Devex patent in bumper making in 1962-1963, and produced almost all of its bumpers without infringing the Devex process. From 1958-1965, Chevrolet infringed the Devex patent in producing 93% of its bumpers; from 1965-1969, Chevrolet infringed in producing 84% of its bumpers. Pontiac infringed from 1955-1968; Cadillac did not begin infringing until 1962; and Fisher Body-Elyria only infringed between 1957 and 1960. This means, of course, that General Motors did *not* infringe at all other times. If plaintiffs' argument that General Motors could not have efficiently cold formed bumpers without the Devex process were correct, then General Motors would have been compelled to use infringing processes in producing 100% of its bumpers. General Motors did not do so, and we reject plaintiffs' argument.

57. The goal of assessing royalties in patent infringement cases is to place the plaintiff in the same position it would have been in if the patent had not been infringed. The burden is on the party seeking damages to show the amount of those damages. *See Reliance Molded Plastics, Inc. v. Jiffy Products*, 215 F.Supp. 402, 412 (D.N.J. 1963), *aff'd per curiam*, 337 F.2d 857 (3d Cir. 1964). Where a plaintiff itself uses the patented process in manufacturing, damages for infringement may take the form of lost profits, and the burden is on the plaintiff to show their amount. *See Panduit Corp. v. Stahlin Brothers Fibre Works, Inc.*, 575 F.2d 1152,

1157, 1158 (6th Cir. 1978); *Zegers v. Zegers, Inc.*, 458 F.2d 726, 729 (7th Cir.), *cert. denied*, 409 U.S. 878 (1972); *Universal Athletic Sales Co. v. American Gym*, 480 F.Supp. 408, 413 (W.D. Pa. 1979). Where, as here, the party alleging infringement does not itself manufacture or use the patented process, compensation may take the form of a reasonable royalty for licensing the use of the patent. As with the manufacturing plaintiff, it is arguable that the licensing plaintiff has the burden of proposing a reasonable royalty. *See Wayne-Gossard Corp. v. Moretz Hosiery Mills, Inc.*, 447 F.Supp. 12, 15 (W.D.N.C. 1976), *aff'd per curiam*, 573 F.2d 191 (4th Cir. 1978). A rule that a nonmanufacturing plaintiff has no obligation to proffer a reasonable basis for calculating a royalty would be unfair to manufacturing plaintiffs and to the courts: the manufacturing plaintiff would have the "heavy burden," *Panduit Corp.*, 575 F.2d at 1158, of proving lost profits, while the non-manufacturing plaintiff would have no obligation to come forward with any evidence at all.

58. Even if there is no explicit burden on a plaintiff to adduce the basis for a reasonable royalty, it is self-evident that there must be enough evidence in the record to allow the fact finder to ascertain a reasonable royalty. In the absence of any evidence as to what would constitute a reasonable royalty in a given case, a fact finder would have no means of arriving at a reasonable royalty, and none could be awarded.

59. Plaintiffs argue here that they are entitled to a percentage of the savings which accrued to General Motors by reason of General Motors' infringement of the patent, and that the standard to which the infringing bumpers should be compared (the "standard of comparison") is the cost of producing bumpers by hot forging or by contour polishing after forming. Plaintiffs also contend that the burden shifted to General Motors to show that plaintiffs' proposed standard should not be used.

60. The Special Master and the trial court agreed that plaintiffs' proposed standard of comparison was not reasonable, because that standard of comparison required accepting the factual premise that General Motors could not efficiently cold form bumpers without the Devex process, a factual premise which the Special Master found to be false. Instead of ruling that plaintiffs had not adduced a reasonable standard of comparison and refusing to award damages on the ground that to do so would involve too much speculation, however, the Special Master awarded damages based upon an industry-wide licensing offer made by plaintiffs in 1964. The district court reversed the Special Master's action in reducing the .75% figure by one-third, but agreed with the Special Master's action in basing the award of royalties on the licensing offer. We agree with that approach, and affirm the award of damages of .75% of the sales price of infringing bumpers.

61. In *Pitcairn v. United States*, 547 F.2d 1106 (Ct. Cl. 1976), *cert. denied*, 434 U.S. 1051 (1978), the court awarded the owner of the patent a royalty based on an industry-wide offer to license made by the owner.[13] In *Pitcairn*, the patent owner had agreed with one licensee to a 2% royalty, and had offered to license anyone else at the 2% rate. The court rejected the owner's contentions that the 2% royalty agreement could not be taken into account because it "was mainly the product of compromise to avoid litigation" and that an offer by a patentee is inadmissible to prove value. *Id.* at 1116-17.

62. The court further gave the offer and the actual rate "a *prima facie* title to acceptance as the reasonable

13. *Pitcairn* involved 28 U.S.C. §1498, which is applied where the infringer is the United States. We agree with the Special Master that the fact that an award is made under §1498 instead of §284 does not preclude the application of the §1498 interest reasoning to a §284 case. The goals of §1498 and §284 are the same: to compensate fully the patent owner for the loss incurred by reason of the infringement.

royalty . . . ." *Id.* at 1118. The court rejected the infringer's contentions that the royalty should be less than 2%:

> For the present case, in which there was only one actual licensee during almost the entire span of the infringement years, and this suit began early in the recovery period, the best that we can do is to accept the only royalty rate "offered freely [by the owner] to everyone" in the industry during that period, a rate actually agreed to, for a time, by . . . the largest manufacturer.

Id. at 1119.

63. While there are factors which distinguish this case from *Pitcairn*, nonetheless *Pitcairn* supports reliance upon the .75% figure here. That plaintiffs here made their offer in the face of industry-wide infringement[14] is somewhat counterbalanced by the fact that plaintiffs, at the time of the offer, had just won a major validity victory in the Seventh Circuit. The .75% offer doubtless included an element of a desire to end this already extensive litigation; that factor, although to be taken into account, does not automatically rule out use of the .75% figure.

64. *In Trio Process Corp. v. L. Goldstein's Sons, Inc.*, 612 F.2d 1353 (3d Cir.), *cert. denied*, 449 U.S. 827 (1980), the court stated that "the actual license rate is an important factor in the determination of a reasonable royalty, at least when those royalties prove or *tend* to prove an established royalty." *Id.* at 1358. The result reached here — that an actual license offer may, if the facts permit, be a factor in assessing a reasonable royalty — logically follows from *Trio Process*.

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14. *See* Panduit Corp. v. Stahlin Brothers Fibre Works, Inc., 575 F.2d 1152, 1158 (6th Cir. 1978) (setting of reasonable royalty after infringement is not the equivalent of negotiations between "truly 'willing' " patent owners and licensees).

65. In short, plaintiffs' proposed royalty rate was based on an incorrect factual premise. There was, however, evidence in the record justifying the Special Master's basic reliance on the .75% figure. Accordingly, we rule that the .75% rate assessed by the district court was appropriate here.[15]

2. *Non-bumpers*

66. The Special Master and the trial court refused to award plaintiffs damages for infringement in non-bumper cold forming because plaintiffs failed to adduce a reasonable standard of comparison upon which to premise such an award and because the Devex patent was relatively unimportant in non-bumper making. Plaintiffs' proposed standard of comparison suffered from the same infirmities as the proposed standard for bumper making: it was based on a factual assertion (that the parts could not be cold formed without the Devex process) which the Special Master found, as a matter of fact, to be incorrect. We affirm the rejection of plaintiffs' proposed standard of comparison, because the facts foreclose the use of that proposed standard.

67. Plaintiffs make an additional argument with regard to non-bumpers: the statute provides that the court "shall" award damages in an amount not less than a reasonable royalty, and that the award of no damages does not comply with the statute. We reject this contention. The statute requires the award of a reasonable royalty, but to argue that this requirement exists even in the absence of any evidence from which a court may derive a

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15. Plaintiffs' proposed royalty was premised on an assertion that was found to be false. There was evidence in the record supporting an alternative amount, however. We need not, therefore, reach the issue of whether plaintiffs had or met any applicable burden of proof with regard to bumper royalties. Nor do we reach the question of when the burden to refute a proposed royalty shifts to the infringer, or what the shifted burden entails.

reasonable royalty goes beyond the possible meaning of the statute. Even if there is no burden of proof on the party seeking damages in this type of case to come forward with a reasonable royalty, there must at the least be enough evidence in the record to allow the factfinder to formulate a royalty. Here, plaintiffs' proposed standard was vitiated by the facts, and there was insufficient evidence in the record upon which the fact finder could rely in formulating an alternative. There was no non-bumper industry-wide offer for the court and Special Master to use in arriving at a reasonable royalty. Thus, plaintiffs are not entitled to collect any royalty for non-bumper infringement.[16]

3. *Interest*

68. The Special Master, affirmed by the district court, awarded interest (delay damages) at the prevailing corporate bond rate on the royalty payments as of the date those payments became due, calculated yearly (number of infringing parts made each year). On appeal, defendant contends that such an award was improper. We disagree, and hold that under the facts of this case the award of interest as the yearly royalty payments became due was not an abuse of discretion.

69. Title 35 U.S.C. §284 provides that an award for infringement shall be "in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court." The language of the statute does not indicate as

16. Even if plaintiffs were entitled to a royalty — which they are not — on non-bumper parts, that royalty would be minimal, given the Special Master's fact findings on the ready interchangeability of the Devex and other processes in non-bumper making.

Because we conclude that plaintiffs are not entitled to any damages for non-bumper infringement, we need not reach the question of whether accused practices 1 and 8 infringed the Devex patent; accused practices 1 and 8 were both non-bumper processes. Appendix at 523, 557.

of when interest, if awarded, shall be calculated. We are not, however, entirely without guidance on this question. In *Aro Manufacturing Co. v. Convertible Top Co.*, 377 U.S. 476 (1964), the Supreme Court examined the 1946 amendment to 35 U.S.C. §284, pursuant to which a claimant became entitled to recover damages instead of damages plus profits:

> The purpose of the change was precisely to eliminate the recovery of profits as such and allow recovery of damages only.
>
> > "The object of the bill is to make the basis of recovery in patent-infringement suits general damages, that is, any damages the complainant can prove, not less than a reasonable royalty, together with interest from the time infringement occurred, rather than profits and damages." H.R. Rep. No. 1587 79th Cong., 2nd Sess. (1946), to accompany H.R. 5311, at 1-2; S.Rep. No. 1503, 79th Cong., 2d Sess. (1946), to accompany H.R. 5311 at 2.

377 U.S. at 505-06 (footnote omitted). Thus, in *Aro* the Supreme Court identified the purpose of the amendment, and stated that it was part of that purpose that damages in the amount of a reasonable royalty plus interest "from the time infringement occurred" be recoverable.

70. Moreover, in a case such as this one, 35 U.S.C. §284 itself supports the award of interest from the date of infringement. Section 284 requires that the damages be "adequate to compensate for the infringement." The complaint in this case was filed in 1956, and the Special Master awarded damages to plaintiffs for infringement which took place in that year. To do otherwise than award interest from 1956 would give defendant a windfall in the form of the use of the royalty money it should have paid to plaintiffs, and would deprive plaintiffs of

money they should have had. Moreover, a failure to award interest as of the date of infringement would encourage defendants to draw out litigation for as long a period as possible. The only sufferer from such a result would be the *prevailing* plaintiff — the innocent party.[17]

71. Nor does the award of interest from the date of infringement require appreciably more effort from those masters or judges with the responsibility of setting the amount due than that which would be expended in any event. Here, the master and trial court labored long and hard to ascertain the extent of the infringement and the amount of royalties due. The award of yearly interest did not add appreciably to this herculean task. The number of bumpers produced by infringing processes per year emerged in this case in connection with establishing exactly which accused practices infringed and the viability of alternatives to infringing practices (which necessitated examining what percentage of the bumpers formed each year were formed with infringing processes). Once the royalty rate was set, the award of interest became relatively simple.[18]

72. The award of interest from the year of infringement is consistent with *Trio Process*, where this court awarded "interest from the date of infringement, and costs" to the owner of the patent. 612 F.2d at 1361. *See also Trio Process Corp. v. L. Goldstein's Sons, Inc.*, 638 F.2d 661, 662 (3d Cir. 1981) (opinion on motion for clarification of mandate). While there was an established license rate in *Trio Process*, we decline to rule that the absence of such a rate precludes an award of in-

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17. Moreover, where, as here, the interest is as much as or more than the royalties, a failure to award interest from the date of the infringement would mean that the losing defendant actually gains from the infringement and the lengthy litigation.

18. Defendant does not object to the method used to calculate the interest nor to the rate, but only to the fact that it was awarded at all.

terest on the facts of this case. Especially where, as here, interest from the date of infringement can be readily calculated, it follows from *Trio Process* and from the purpose of the statute that interest should be calculated from the date of infringement. Policy likewise dictates this result: failure in a case like this one to award interest as of the date of infringement rewards infringers where those infringers have refused to accept or negotiate a royalty, and discourages the amicable licensing of patents.

73. This result is also consistent with *Hartford National Bank & Trust Co. v. E.F. Drew & Co., Inc.*, 188 F.Supp. 347 (D.Del. 1960), *aff'd per curiam*, 290 F.2d 589 (3d Cir.), *cert. denied*, 368 U.S. 825 (1961), in which the court, prior to *Aro*, awarded interest "from the end of each calendar year in which defendant's sales were made." 188 F.Supp. at 349. In addition, *see Marvel Specialty Co. v. Bell Hosiery Mills, Inc.*, 386 F.2d 287 (4th Cir. 1967), *cert. denied*, 380 U.S. 1030 (1968), in which the court awarded interest on the royalties from the date those royalties had become payable. The royalties in that case were, however, as in *Trio Process*, based on an established rate at which the injured party had granted actual licenses.

74. In *Pitcairn v. United States*, 547 F.2d at 1120-24, the court awarded delay damages "computed on a calendar year basis with interest starting on January 1 of each year on the royalties accrued during the preceding calendar year." *Id.* at 1121.[19] Such an award was necessary to " 'accomplish complete justice as between plaintiff and the United States.' " *Id.* at 1120, *quoting Waite v. U.S.*, 282 U.S. 508, 509 (1931). The court in *Pitcairn* used Moody's Composite Index of Yields on Long Term Corporate Bonds to set the delay

19. Delay damages would continue to accrue until "the date of payment of the court's judgment herein." 547 F.2d at 1120.

damage ("interest") rate on the unpaid royalties. 547 F.2d at 1121.

75. We see no reason to rule that §284 does not allow an award of interest, or "delay damages," from the date of infringement in the face of the *Pitcairn* rule that §1498 allows such an award. Sections 1498 and 284 mandate doing justice to the party whose patent has been infringed. The failure to award interest to plaintiffs here would penalize the prevailing party and reward the infringer for its wrongdoing, and we decline to reach such an inequitable result, one which, moreover, would be inconsistent with Third Circuit precedent as well as with the applicable statute.

76. The result reached here is inconsistent with that reached in *Wahl v. Carrier Manufacturing Co.*, 511 F.2d 209 (7th Cir. 1975), where the court ruled that "interest should run from the date damages are liquidated." 511 F.2d at 215. The result reached here is not, however, necessarily inconsistent with that reached in *Georgia-Pacific Corp. v. U.S. Plywood Champion Papers Inc.*, 446 F.2d 295, 301 & n.7 (2d Cir.), *cert. denied*, 404 U.S. 870 (1971), where the court rejected the argument that *Aro's* quotation of H.R. Rep. No. 1587 constituted an adoption of the rule that interest should run from the date of infringement. In *Georgia-Pacific*, the court ruled that the award of interest is discretionary with the trial court, and that the trial court had the discretion to award interest as of the date of the last infringement. The court did not rule, however, that it would be an abuse of discretion to award interest as of the date of infringement. *But see Milgo Electronic Corp. v. United Business Communications, Inc.*, 623 F.2d 645, 667-68 (10th Cir.), *cert. denied*, 447 U.S. 928 (1980) (in patent cases the normal rule that interest only begins to run after the damages are liquidated is extended to allow the trial judge the discretion to award interest from the date of last infringement).

77. For the foregoing reasons we affirm the judgment of the District Court.[20]

A True Copy:

Teste:

Clerk of the United States Court of Appeals
for the Third Circuit

20. We affirm the award of costs (including the Special Master's fee) against defendant. We also affirm the district court (and Special Master's) ruling that an award of multiple damages and attorney's fees would not be appropriate in this case.

UNITED STATES COURT OF APPEALS

For The Third Circuit

Nos. 80-2550/80-2551

DEVEX CORPORATION, TECHNOGRAPH, INC., WILLIAM C. McCOY, THEODORE A. Te GROTENHUIS, FREDERICK B. ZIESENHEIM, MARJORIE Te GROTENHUIS, WILLIAM C. McCOY, JR., and KATHERINE M. BASSETT

vs.

GENERAL MOTORS CORPORATION

Devex Corporation, Technograph, Inc., William C. McCoy, Jr., individually and as Executor of the Estate of William C. McCoy, deceased, Theodore A. Te Grotenhuis, Frederick B. Ziesenheim, Marjorie Te Grotenhuis, and Katherine M. Bassett,

Appellants in No. 80-2550

General Motors Corporation,

Appellant in No. 80-2551

(D.C. Civil No. 3058)

ON APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

Present: GIBBONS and HUNTER, *Circuit Judges* and STERN, *District Judge**

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* Honorable Herbert J. Stern, United States District Judge for the District of New Jersey, sitting by designation.

JUDGMENT

This cause came on to be heard on the record from the United States District Court for the District of Delaware and was argued by counsel on September 18, 1981.

On consideration whereof, it is now here ordered and adjudged by this Court that the judgment of the said District Court, entered October 6, 1980, be, and the same is hereby affirmed. Costs taxed against appellants in each appeal.

ATTEST:

Sally Mrvos
Clerk

December 15, 1981

UNITED STATES COURT OF APPEALS

For the Third Circuit

Nos. 80-2550 and 80-2551

DEVEX CORPORATION, et al.,
Plaintiffs-Appellants, Cross-Appellees

v.

GENERAL MOTORS CORPORATION,
Defendant-Appellee, Cross-Appellant

SUR PETITION FOR REHEARING

Present: ALDISERT, GIBBONS, HUNTER, WEIS, GARTH and SLOVITER, *Circuit Judges*

The petition for rehearing filed by
Defendant-Appellee, Cross-Appellant

in the above entitled case having been submitted to the judges who participated in the decision of this court and to all the other available circuit judges of the circuit in regular active service, and no judge who concurred in the decision having asked for rehearing, and a majority of the circuit judges of the circuit in regular active service not having voted for rehearing by the court in banc, the petition for rehearing is denied.

By the Court,
/s/ James Hunter, III, Judge

Dated: January 13, 1982

UNITED STATES COURT OF APPEALS

For the Third Circuit

Nos. 80-2550

DEVEX CORPORATION, et al.,
Plaintiffs-Appellants, Cross-Appellees

v.

GENERAL MOTORS CORPORATION,
Defendant-Appellee, Cross-Appellant

SUR PETITION FOR REHEARING

Present: GIBBONS and HUNTER, *Circuit Judges*, and STERN,* *District Judge*

The petition for rehearing filed by
Plaintiff-Appellants, Cross-Appellees

in the above entitled case having been submitted to the judges who participated in the decision of this court and no judge who concurred in the decision having asked for rehearing, the petition for rehearing is denied.

By the Court,
/s/ James Hunter, III, Judge

Dated: January 13, 1982

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* Honorable Herbert J. Stern, United States District Judge for the District of New Jersey, sitting by designation.

Opposition

Supreme Court, U.S.
FILED
APR 13 1982
ALEXANDER L. STEVAS
CLERK

No. 81-1718

IN THE
Supreme Court of the United States

OCTOBER TERM, 1981

DEVEX CORPORATION, *et al.*,

Petitioners,

v.

GENERAL MOTORS CORPORATION,

Respondent.

GM BRIEF IN OPPOSITION TO DEVEX PETITION FOR CERTIORARI

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COUNTERSTATEMENT OF THE CASE

Plaintiffs' petition totally ignores the restrictions applied by the Courts of Appeal for the Seventh Circuit and Third Circuit in adjudicating the issues of validity and infringement. The Court of Appeals for the Seventh Circuit held claim 4 valid by applying a strict and narrow non-literal claim construction limited to the borax coaction demonstrated by Plaintiffs' validity trial laboratory tests. 93a, 95a*. The Court of Appeals for the Third Circuit held infringement by reliance upon the severe "cleaning problem" which, allegedly would be encountered if the borax were omitted from the soap lubricant. 138a, 140-1a.

The measure of damage in this case is the reasonable royalty. Plaintiffs' sole contention as to nonbumpers was that such royalty is a portion of the "savings and gains" of the infringing processes used by GM as compared to manufacture by hot forging or machining. They made no comparison with the

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*Page numbers with "a" suffix are to the joint appendix.

alternative cold forming processes that were not accused, or held to be not infringing.

The comprehensive pretrial order listed a total of 61 bumper and nonbumper cold forming practices charged as infringements, together with 45 noncharged practices used by GM to make the same products in production volumes comparable to those of the accused practices. Most of the nonaccused practices are cold forming practices differing from the corresponding charged practices only by the absence of borax. Of the 61 charged practices, 21 were held to be noninfringing. Thus a total of 40 pretrial order practices were held within the patent and 66 pretrial order alternative practices were either admitted to be outside the patent or were held to be so.

Three nonaccused nonbumper cold forming practices, each in the pretrial order, were in use by GM at the time the first accused cold forming practice was instituted in 1952.[1] When the patent expired in 1969, two of these nonaccused practices were in use, and the product made by the third had been discontinued. These two nonaccused practices, as well as other outside-the-patent cold forming processes, continued unmodified after the patent expiration, even though the patent process was then open to the public and available without charge.

There were many shifts from accused nonbumper cold forming practices to nonaccused practices used to make the same parts at the same locations. There were a few shifts in the opposite direction. Plaintiffs adduced no evidence that either the nonaccused cold forming practices or accused practices held to be noninfringing, were more costly or less effective than the corresponding practices held to infringe, or that cleaning was any different.

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[1] See Annex (Delco Remy, nonaccused Y; Delco Products, non-accused S; Oldsmobile, nonaccused II).

In some instances GM concurrently purchased steel from different suppliers with the phosphate and lubricant already applied, which steel was used interchangeably to make the same parts on the same machines. In three instances, the usage of such steel from some suppliers was accused because their coating process involved borax, whereas steel from other suppliers was not accused because their coating process did not involve borax.[2] There was no evidence and no contention by Plaintiffs that any performance differences occurred.

SUMMARY OF ARGUMENT

No "savings and gains" can be relevant to the reasonable royalty unless they are attributable to the patented process and relate to comparable noninfringing alternatives. The Petition is bottomed on irrelevant alleged "savings and gains" over outmoded machining and hot forging practices that would not have been used in any event. Even if we assume (contrary to the facts) that the figures stated in the Petition are correct, the numerous, contemporaneous, and continuously used noninfringing cold forming processes described in the record and relied upon by the master constitute the only relevant comparison.

The master heard extensive testimony by witnesses who actually used the various accused and nonaccused cold forming practices, he weighed the evidence, and he made numerous explicit findings of fact on the damages issue. He found that GM received only "slight" benefit (if any) from the accused nonbumper cold forming practices. He further found as the fact that Plaintiffs had relied upon a fatally defective standard of comparison and that no dollar amount could be derived from

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[2] See Annex (Chevrolet Bay City, nonaccused E vs. accused practice 8; Delco Moraine, nonaccused R vs. accused practice 24; Inland, nonaccused FF vs. accused practice 39).

their evidence, even if a nominal award might otherwise be appropriate.

Plaintiffs had the burden of proving damages, and therefore a reasonable royalty. *Rude* v. *Wescott*, 130 U.S. 152, 167 (1889). As a minimum, Plaintiffs were required to produce evidence providing a "satisfactory basis" for a determination of damages. This they did not do.

ARGUMENT

The Petition Misstates the Facts. There Are No Relevant "Savings and Gains."

The proposed question states that there were "savings to the defendant of over $60 million," as if this were the found fact. Elsewhere, the Petition states that GM documents, testimony, and actual practice "all show without contradiction in the record that the Hendricks lubricating system for cold extrusion was superior and indeed at times, even dominant and preemptive, making the difference between success and failure." p. 6. These and other similar Petition statements torture the record facts. They repeat unsupported argument made below, carefully considered, and rejected.

The reasonable royalty cannot exceed a fraction of the dollar benefits (if any) achieved by usage of the patent in preference to the alternative that would be used. The key alternatives are cold forming processes outside the patent. Some of these processes were in use before adoption of any accused practice. These, together with others, were extensively used by GM during the patent term, and after. Plaintiffs' "savings and gains" figures are not based on these actually-used alternatives and thus cannot demonstrate relevant dollar "savings and gains," even were the figures otherwise correct.

The Petition is bottomed on the absence of practical cold forming alternatives to the Henricks patent, but Plaintiffs'

pretrial order admissions show that there were many such alternatives. As we show below, this is exactly what the master found and why he held Plaintiffs' contention to be untenable.

The Hargesheimer testimony shows Plaintiffs' fallacy, not the contrary as contended at page 7 of the Petition. Of course lubrication is important to cold forming, and cold forming processes received progressively increased usage, just as Hargesheimer testified. But Hargesheimer also testified, for example, on universal joint bearing cup manufacture by cold forming at both Saginaw and at Chevrolet-Parma. Saginaw initially used accused practice 56. It then used accused practice 57. After the patent expired, it changed to a version of non-accused practice K. Chevrolet-Parma progressed from accused practice 17 to accused practice 18. By 1964 it was using nonaccused cold forming practice K. See the pretrial order definitions of these processes in the annex to this brief. Hargesheimer testified that usage of the nonaccused practices in lieu of accused practices did not affect lubricity, cleanability, or anything else. His testimony was fully supported by the prolonged actual production of bearing cups with the nonaccused practices, before and after patent expiration.

In some instances Plaintiffs based their "savings and gains" on replacing machining or hot forging by *nonaccused* cold forming processes. The cost comparison relied upon for Delco Remy DC generator frames, for example, compared the existing machining process and *nonaccused* practice Y, adopted in 1951. That nonaccused practice was used until 1954, and continuously after 1957 to the trial in 1978. Nine years of this usage was after patent expiration. From November 1954 to August 1957, a TSP neutralizing rinse, now held to be within the patent, was used. Annex, p. a4. Witnesses familiar with the process both with and without the neutralizing rinse testified that outside the patent plain water rinse was entirely effective, as the actual usage confirmed. To be sure, in this instance

Plaintiffs relied upon GM records in the regular course of business — but the records did not support Plaintiffs' position. The very substantial cost savings achieved in going from the prior machining practice to the *nonaccused* cold forming practice in 1951, relied upon by Plaintiffs, obviously cannot be credited to the patent. Plaintiffs introduced no evidence of any cost savings associated with a change between a nonaccused cold forming practice and an accused practice, although many such changes occurred.

Contrary to the Petition, GM does not now admit the "savings" endlessly referred to in the Petition, and it did not do so below. The asserted "savings" are a hodgepodge of bits and pieces of record evidence taken out of context in complete disregard of the equally effective outside-the-patent cold forming processes. Plaintiffs' "savings" do not, and cannot, show anything more than advantages of cold forming generally — not advantages of the patent process in relation to the admittedly outside-the-patent cold forming alternatives.

The Master Properly Found Against Plaintiffs. The Courts Below Properly Confirmed The Findings.

The master heard 44 witnesses during 53 days of trial. Their testimony covered the 61 charged processes and 45 noncharged processes set forth in the pretrial order, as well as other processes. He disentangled the representations of the parties (including those now repeated in Plaintiffs' Petition), he assessed the credibility of the witnesses, he drew inferences as his assessment of the witnesses and the testimony justified, and he recorded his findings of fact in a well-considered and comprehensive report. 153a to 279a.

The master particularly focussed on the fallacy now embedded in Plaintiffs' Petition. It was identified by the master as the "most important single disagreement between the parties." In his words, the question was "whether defendant could have

cold formed bumpers (and nonbumper parts) without the Henricks process." 212a. He squarely resolved the issue by specific fact findings. He found as a fact that the question "does not even seem to me to be a close one" and that "far from dominating the field, the Henricks process had relatively slight importance to defendant in the production of non-bumper extruded parts." 235a.

The master held that Plaintiffs' standard of comparison was fatally defective. He then looked hard for an evidential basis upon which he could award a reasonable royalty for the slight value the process had on nonbumpers. He found that "plaintiffs' savings and gains evidence makes it impossible to quantify such value as it had in a legally acceptable way." 214a.

The District Court expanded the infringing processes to include the borax and TSP rinse processes. 289a. But the evidence, particularly the usage of the 45 non-charged processes and the 21 accused practices held not to infringe, set forth in the pretrial order, still left plenty of actually-used and equivalent cold forming processes outside the patent. The District Court specifically considered the Devex contentions now reflected in the Petition. He ruled against Devex, just as the master had previously done. 294-5a.

The Court of Appeals affirmed the denial of nonbumper royalties by the master and by the District Court. 334a. This affirmance was made despite the Court's erroneous assumption that Plaintiffs may have no burden of proof on damages. 335a. The master was again affirmed.

Certiorari is not the place to reassess evidence and overturn concurrent fact findings below. *Graver Tank* v. *Linde Air Prod.*, 336 U.S. 271, 275 (1949); *Goodyear Tire & Rubber Co.* v. *Ray-O-Vac*, 321 U.S. 275, 278 (1944). The fact findings in the master's most thorough and thoughtful report resolved the conflicting evidence and have been justifiably respected by

both reviewing courts. Plaintiffs' Petition seeks still another review of findings concurred in by three tribunals below. Nothing makes this a case of public importance that might warrant a fourth review by this Court of this factual determination.

Plaintiffs Had The Burden Of Proving The Reasonable Royalty

This Court early held that a patent plaintiff seeking 'actual damages' is bound to furnish evidence by which the (trier of fact) may assess them. *Mayor of New York* v. *Ransom*, 64 U.S. (23 How.) 487, 491 (1860). In *Rude* v. *Wescott*, 130 U.S. 152, 167 (1889), this Court specifically rejected "conjectured estimates" of the value of the invention to the defendants because such estimates "furnished no satisfactory basis for any damages." This Court allowed discovery in *Sinclair Refining Co.* v. *Jenkins Petroleum*, 289 U.S. 689 (1933), because a party seeking to recover damages based on the value of a patent has the burden of proving them.

In this case, Plaintiffs first needed to prove that the borax present in the infringing cold forming processes coacted so as to produce a cold formed product that was easier to clean than in the absence of borax. This they did not do, and indeed did not try to do. Second, Plaintiffs had to show that there were savings attributable to including borax in relation to equivalent processes not including the borax. Again they failed. Indeed, there is no evidence at all that commercial product cleaning was any different whether the borax was included or it was not, and Plaintiffs failed to show performance differences of any kind as between the borax-containing infringing processes and the pertinent no-borax actually-used alternative cold forming processes.

CONCLUSION

For the reasons stated, the Devex Petition should be denied.

Respectfully submitted,

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April 8, 1982

Appendix

ANNEX

Selections From The Pretrial Order

* * * * *

CHEVROLET-BAY CITY

* * * * *

ACCUSED PRACTICE NO. 8

The practice of cold forming steering knuckle parts and other miscellaneous parts from about July 1966 through March 1969 wherein steel wire was phosphate coated, immersed in an aqueous solution of Parcolene 21 or Stancoat "L", and coated with Bonderlube 234 by suppliers, then shipped to Chevrolet Bay City where the wire was drawn through a draw die using Ajax No. 5 dry powder drawing compound and then cut into blanks and then the blanks were automatically transferred through a series of progressive cold forming operations with extreme pressure oil being applied to the blanks immediately ahead of each cold forming operation.

NONACCUSED PRACTICE E

The practice of cold forming steering knuckle parts and other miscellaneous parts prior to March 1969 wherein steel wire was phosphate coated, immersed in an aqueous solution of Parcolene 24 and coated with either Bonderlube 233 or 234 by suppliers, then shipped to Chevrolet Bay City where the wire was drawn through a draw die using Ajax No. 5 dry powder compound and then cut into blanks and then the blanks were automatically transferred through a series of progressive cold forming operations with extreme pressure oil being applied to the blanks immediately ahead of each cold forming operation.

CHEVROLET-PARMA

* * * * *

ACCUSED PRACTICE NO. 17

The practice of making universal joint bearing races and . . . from about 1957 through May 1963, wherein ferrous metal was coated with Bonderite 181X, then immersed in water, then immersed in an aqueous solution of Parcolene 21, then dipped in an aqueous solution of Bonderlube 239 and Parker molybdenum disulfide additive No. PTD-1219-B, and then cold formed.

ACCUSED PRACTICE NO. 18

The practice of cold forming universal joint bearing races and . . . from about May 1963 through May 1964 wherein ferrous metal was coated with Bonderite 181X, immersed in an aqueous solution of Parcolene 21, dipped in a solution of Bonderlube 234 and Parker molybdenum disulfide additive PTD-1219-B, and then cold formed.

NON-ACCUSED PRACTICE K

The practice of cold forming universal joint bearing races and . . . from about May 1964 to March 1965 and from March 1966 to October 1968 wherein ferrous metal was coated with Bonderite 181X, immersed in an aqueous solution of Parcolene 24, dipped in a solution of Bonderlube 234 and Parkermolybdenum disulfide additive PTD-1219-B, and then cold formed.

NON-ACCUSED PRACTICE L

The practice of cold forming universal joint bearing races and . . . from about February 1965 to February 1966 wherein ferrous metal was coated with Pennwalt Foscoat B-1 zinc phosphate immersed in an aqueous solution of Pennwalt Fosrinse R-1, and dipped in a solution of Pennwalt Foslube L-20 and then cold formed.

DELCO MORAINE

* * * * *

ACCUSED PRACTICE NO. 24

The practice of cold forming DM-6412 steel wire supplied by Republic Steel Company precoated with phosphate and Granolube No. 14 lubricant to make booster studs from June 1968 through March 4, 1969.

* * * * *

NON-ACCUSED PRACTICE R

The practice of cold heading steel wire supplied by Jones & Laughlin Steel Company precoated with phosphate and Bonderlube 233 lubricant to make brake booster stud blanks in 1968 and 1969.

* * * * *

DELCO PRODUCTS DIVISION

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NON-ACCUSED PRACTICE S

The practice of making shock absorber cylinder tubes from 1951 to 1975 wherein the tubes were coated with Granodraw 1 or Granodraw 2 zinc phosphate coating, then coated with Montgomery's DL-691 lubricant and then cold drawn.

* * * * *

DELCO REMY DIVISION

* * * * *

ACCUSED PRACTICE NO. 29

The practice of making . . . DC Generator Frames between November 1954 and August 1957 . . . wherein ferrous metal was zinc phosphate-coated, then immersed in an aqueous solution containing trisodium phosphate, then coated with Montgomery DF-1101, then the coated metal was flooded with oil at the press and cold formed.

* * * * *

NON-ACCUSED PRACTICE Y

The practice of making . . . DC Generator Frames from 1951 through November 1954 and after August 1957 . . . wherein ferrous metal was zinc phosphate-coated, then immersed in water, then coated with Montgomery DF-1101, flooded with oil at the press, and then cold formed.

* * * * *

INLAND DIVISION

* * * * *

ACCUSED PRACTICE NO. 39

The practice of making brake hose fittings beginning about 1964 using precoated steel wire purchased from Republic Steel Corporation wherein the wire which was coated with Bonderlube 181X zinc phosphate, immersed in an aqueous solution of Parcolene 21, and coated with Bonderlube 234 lubricant was cold formed.

* * * * *

NON-ACCUSED PRACTICE FF

The practice of making brake hose fittings from about 1965 wherein the precoated steel wire was purchased from Jones and Laughlin Steel Company coated with zinc phosphate and Bonderlube 233.

* * * * *

OLDSMOBILE DIVISION

* * * * *

NON-ACCUSED PRACTICE NO. II

The practice of cold forming rocket ogives from about December 1951 to June 1953 in which ferrous metal was coated with zinc phosphate, then coated with H. A. Montgomery's DQ-593 and then cold formed.

* * * * *

SAGINAW STEERING GEAR

* * * * *

ACCUSED PRACTICE NO. 56

The practice of cold forming ferrous metal which comprises forming on that metal a coating of Bonderite 181X, then immersing the metal in an aqueous solution of Parcolene 21, then coating the metal with bonderlube 239 and then cold forming the metal. This practice was used . . . from Model Year 1958 until about September 1962 to produce universal joint bearing races. . . .

ACCUSED PRACTICE NO. 57

The practice of cold forming ferrous metal which comprises forming on that metal a coating of Bonderite 181X then immersing the metal in an aqueous solution of Parcolene 21, then coating the metal with Bonderlube 234 and then cold forming the metal. This practice was used . . . from September 1962 through March 1969 to produce universal joint bearings. . . .

* * * * *

Petitioner's Reply Brief

Supreme Court, U.S.
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CLERK

No. 81-1718

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OCTOBER TERM, 1981

DEVEX CORPORATION, TECHNOGRAPH, INC., WILLIAM C. McCOY, JR., individually and as Executor of the Estate of WILLIAM C. McCOY, deceased, THEODORE A. TE GROTENHUIS, FREDERICK B. ZIESENHEIM, MARJORIE TE GROTENHUIS, and KATHARINE M. BASSETT,

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REPLY BRIEF IN SUPPORT OF PLAINTIFFS' PETITION FOR CERTIORARI

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REPLY BRIEF IN SUPPORT OF PLAINTIFFS' PETITION FOR CERTIORARI

1. GM's Brief in Opposition (DB) simply ignores the applicable rule on proving "savings and gains" (PP* 9-11) and the undisputed evidence that under that rule GM saved $60 million by using the Henricks process in making non-bumper parts (PP 11).

2. GM's objection to plaintiffs' standard of comparison —machining and hot forging—is groundless because that method is the very one used by GM at and during the infringement period (PP 5-6).

3. As to GM's proposed standard of comparison—some non-infringing cold forming process (DB 6)— it did not prove that its savings were less than $60 million.

* Plaintiffs' Petition is designated as "PP".

4. GM ignores the stipulated usage at Saginaw Steering Gear Division on over 90% of its cold extruded production, found to infringe. And GM ignores ,too, the fact that the District Court (affirmed by the Court of Appeals), by reversing the Master on the rinse practices, established infringement by GM in its manufacture of 1.3 billion non-bumper parts (PP 8). That extensive infringement is a decisive admission by GM of the great value to it of the Henricks process (see PP 6-8).

5. GM's citation of its usage, also, of non-accused practices ignores its own concession in its proposed findings of fact (K-12):

> "Specifically the Plaintiffs' negotiators would be aware that unlimited running royalties accumulating to a large sum, or threatening to do so, would generate a strong incentive to GM to avoid the patent process and curtail or terminate GM usage."

Obviously defendant's negotiators and production personnel would also be aware of that GM policy in choosing to use the Henricks process to manufacture 1.3 billion parts.*

Even if GM's alleged alternatives were deemed to be "acceptable" substitutes, the courts below relied so heavily on them as to arbitrarily eliminate all value to the finding of non-bumper infringement. As Judge Markey stated in *Panduit Corp.* v. *Stahlin Bros. Fibre Works,* 575 F.2d 1152, 1162 (6th Cir. 1978):

> "The 'acceptable substitute' element, though it is to be considered, must be viewed of *limited influence*

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* The fact that GM used non-accused practices on some parts merely demonstrates that GM only used the Henricks process when required.

where the infringer knowingly made and sold the patented product for years while ignoring the 'substitute' ".

Certainly the use of substitutes does not cancel GM's infringing manufacture of 1.3 billion parts.

6. GM also seeks to reargue that there was no infringement on the non-bumper manufactures, in face of the concurrent findings below to the contrary.

CONCLUSION

For the reasons stated in our Petition and herein, the Petition for Writ of Certiorari in Case No. 81-1718 should be granted.

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